Vol. 933 Number 3

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of the

UNITED STATES PATENT AND TRADEMARK OFFICE

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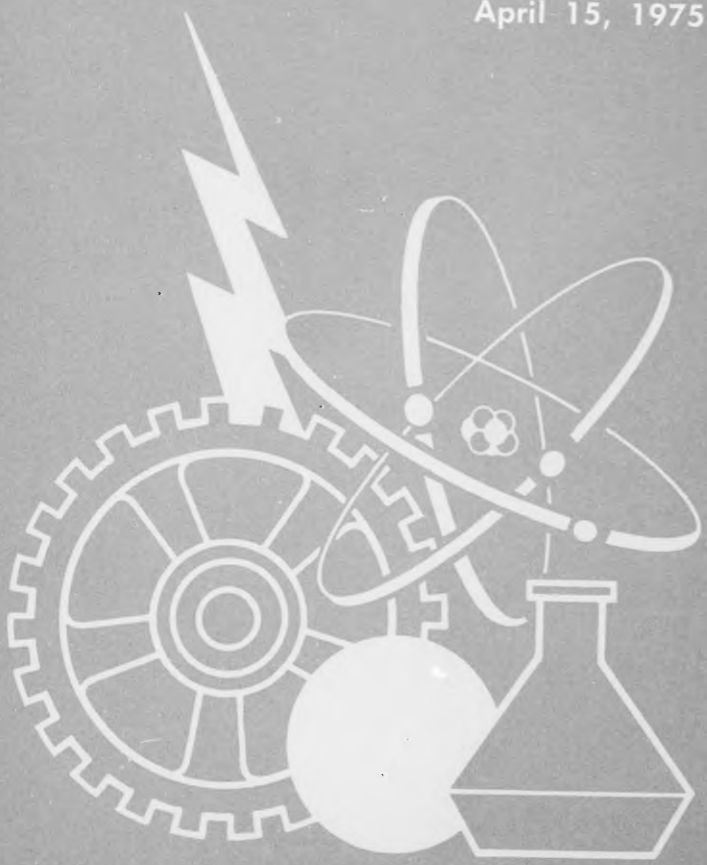

U.S. DEPARTMENT OF COMMERCE

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OFFICIAL GAZETTE of the
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April 15, 1975 Volume 933 Number 3

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PATENT AND TRADEMARK OFFICE NOTICES

Hearings Before the Board of Appeals

In recent years the backlog of cases awaiting decision by the Board of Appeals has grown substantially. The average time elapsing between filing of the examiner's answer and final disposition is now roughly 17 months. Intensive effort by the Board and greater use of acting examiners-in-chief have been sucessful in raising the number of dispositions, but at the same time the number of appeals continues to grow. Thus in the first six months of 1974, the Board disposed of 1,193 appeals but received 1,915; in the last half of the year the Board disposed of 1,993 appeals but received 2,179.

In this connection it will be helpful if applicants and attorneys will dispense with oral hearings except where unusual circumstances are present which make a hearing important to the decision. Appeals submitted on brief receive just as careful consideration as those in which oral argument is presented, nor are any implications drawn as to the merits of the appeal from failure to request a hearing. It has been the Board's experience that in the ordinary case the hearing is not of great value in arriving at the ultimate decision.

Appellants are also encouraged to review cases where a hearing has already been requested, with a view to withdrawing the request if it is not necessary. It is particularly important that the Board be given timely notice whenever circumstances prevent the applicant or his representative from appearing at a scheduled hearing.

Rule 194 (37 CFR 1.194) limits oral argument to thirty minutes unless otherwise ordered by the Board. It has been the Board's experience, however, that effective arguments can be presented in less than thirty minutes in most cases. Effective immediately the Board will be informing appellants in the notices of hearing mailed to them that oral argument will be limited to *twenty minutes* unless otherwise ordered before the hearing begins.

The assistance of the public will be appreciated.

C. MARSHALL DANN,
Commissioner of Patents and Trademarks.

Date: Mar. 20, 1975.

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,611,813, Sharpless and Eichert, Jr., MAGNETIC DATA STORAGE SYSTEM, **filed** May 8, 1967, D.C. Md. (Baltimore), Doc. 18317, *Technitrol, Inc.* v. *Honeywell, Inc.* Stipulation of dismissal filed on Dec. 11, 1974.

2,968,158, Ruschig, Aumuller, Korger, Wagner, Scholz and Bander, NEW BENZENE SULFONYL UREAS; COMPOSITION AND PROCESS FOR LOWERING BLOOD SUGAR THEREWITH, **filed** Dec. 13, 1974, D.C., S.D.N.Y., Doc. 74–C–5469(HRT), *The Upjohn Company* v. *Premo Pharmaceutical Laboratories, Inc.*

3,078,546, B. E. Kiernan, CUTTING TOOL, **filed** Dec. 10, 1974, D.C., C.D. Calif. (Los Angeles), Doc. CV–74–3602, *Bruce E. Kiernan* v. *Tooling Systems, Inc.*

3,083,837, Jones, Noll, Nielsen, Klos and Brekelbaum, CRANE; **3,134,488,** Brekelbaum, Jones, Noll, Nielsen and Klos, same, **filed** Nov. 27, 1974, D.C., E.D. Wis. (Milwaukee), Doc. 74–564, *Koehring Company* v. *The Manitowoc Company, Inc.*

3,086,528, Eichelman and Smiley, INTERMITTENT VACUUM REGULATOR, **filed** Dec. 6, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c3528, *Chemetron Corporation* v. *Airco, Inc.*

3,134,488. (See 3,083,837.)

3,136,385, J. M. Eitel, HIGH VOLTAGE AERIAL LIFT AND CONTROL THEREFOR, **filed** Nov. 4, 1974, D.C., E.D. Mo. (St. Louis), Doc. 74–758C(1), *McCabe Powers Body Company* v. *General Cable Corporation.*

3,303,594, K. R. Lewis, FIREARM BARREL, SHROUD, FRAME, AND CYLINDER CONSTRUCTION; **3,633,302,** same, CYLINDER MECHANISM FOR REVOLVER-TYPE FIREARMS; **3,683,535,** same, HANDGUN GRIP CONSTRUCTION, **filed** Dec. 23, 1974, D.C. Conn. (Hartford), Doc. H–74–400, *Richard S. Pastore* v. *The Leisure Group, Inc. and Sporting Firearms Div.*

3,317,955, Schurman and Confer, APPARATUS FOR BLOW MOLDING HOLLOW CONTAINERS; **3,452,125,** same, METHOD OF AND APPARATUS FOR BLOW MOLDING THERMOPLASTIC MATERIAL, **filed** Dec. 23, 1974, D.C., S.D., Ill. (Peoria), Doc. S–C–74–130, *W. R. Grace & Co.* v. *General Electric Company.*

3,391,773, Nicole and Plyant, PROPORTIONAL SPACING EMBOSSING TOOL; **3,485,335,** J. McMahon, TAPE EMBOSSING MACHINE WITH SELECTIVELY VARIABLE TAPE FEED INCREMENTS, **filed** June 18, 1973, D.C., N.D. Ill. (Chicago), Doc. 73c1567, *W. H. Brady Co.* v. *Dymo Industries, Inc. and C.T. Corporation System.* Enter order, Dec. 19, 1974.

3,437,669, J. King, PROCESS FOR PRODUCING AN ODOROUS ISOMER OF DIISOPROPYL DIHYDROCOUMARIN, **filed** Dec. 20, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c3702, *Velsicol Chemical Corporation* v. *Monsanto Company.*

3,441,071, Schurman and Confer, PLASTIC CONTAINER AND METHOD OF MAKING, **filed** Dec. 23, 1974, D.C., E.D. Ill. (East St. Louis), Doc. CV 74–173–D, *W. R. Grace & Co.* v. *General Electric Company.*

3,452,125. (See 3,317,955.)

3,461,585, R. H. Roberts, PICTURE MOUNTING ARRANGEMENT, **filed** Dec. 19, 1974, D.C., S.D.N.Y., Doc. 74–C–5571, *Art Leather Co. Inc.* v. *Dorose Novelty Co., Inc.*

3,476,307, Faltin and Faltin, FOLDABLE MAILING PIECE, **filed** Dec. 24, 1974, D.C., M.D. Pa. (Scranton), Doc. C–74–1243, *Parade Publications Inc.* v. *Hans G. Faltin and William G. Faltin.*

3,485,335. (See 3,391,773).

3,506,949, Venaleck and Gabor, ELECTRICAL CONNECTOR CLIP DEVICE; **Re. 28,064,** same, **filed** Dec. 5, 1974, D.C. Conn. (Bridgeport), Doc. B–74–448, *AP Products Incorporated* v. *Continental Specialties Corp.*

3,622,364, Sugahara, Miyazawa, Nakazawa and Maeno, COLOR FORMER FOR PRESSURE SENSITIVE RECORDING PAPER AND PROCESS FOR PRODUCING SAME; **3,753,761,** same, PRESSURE SENSITIVE RECORDING PAPER, **filed** Dec. 17, 1974, D.C., S.D.N.Y., Doc. 74–C–5534, *Moore Business Forms, Inc.* v. *Mizusawa Kagaku Kogyo Kabushiki Kaisha et ano.*

3,633,302. (See 3,303,594.)

3,661,220, C. R. Harris, WEIGHING DEVICE FOR LOGGING TRUCKS OR THE LIKE, **filed** Sept. 20, 1972, D.C., W.D. Wash. (Seattle), Doc. 609–72C2, *Electro Development Corporation* v. *Structural Instrumentation Inc. and Measurement Systems, Inc.* Case settled and dismissed, Dec. 23, 1974.

3,678,151, Horonick and Munschy, BIOLOGICAL STAINING METHOD, **filed** Dec. 20, 1974, D.C.N.J. (Newark), Doc. 74–1992, *Gugol Science Corp.* v. *Lemmon Pharmacal Company.*

3,683,535. (See 3,303,594.)

3,729,142, Rangel-Garza and Leal-Diaz, DRIPPERS FOR IRRIGATION, **filed** Dec. 26, 1974, D.C., M.D. Fla. (Tampa), Doc. 74–796–C T.K., *Javier Rangel-Garza, Jamie Leal-Diaz and Balm Grove Service, Inc.* v. *Tom Cecchettini and Agrotechnics, Inc.*

3,774,222, A. Delao, CORRUGATED BOARD PAINT FILTER, **filed** Dec. 19, 1974, D.C., C.D. Calif. (Los Angeles), Doc. CV 74–3715WPG, *Key Container Company* v. *Florence Filter Corporation.*

3,753,761. (See 3,622,364.)

3,852,850, L. Marmor, KNEE PROSTHESIS, **filed** Dec. 23, 1974, D.C., N.D. Ind. (South Bend), Doc. S74–260, *Richards Manufacturing Company, Inc.* v. *Zimmer USA, Inc.*

3,855,761, Louks and Louks, APPARATUS AND METHOD FOR REMOVING TASSELS, **filed** Dec. 24, 1974, D.C., N.D. Tex. (Lubbock), Doc. CA–5–74–148, *Robert A. Louks and Gordan D. Louks* v. *Walter F. Larson and W. F. Larson, Inc.*

Re. 28,064. (See 3,506,949.)

2,846,179, M. C. Monckton, SLEEVE VALVE, **filed** Nov. 18, 1974, D.C. Del. (Wilmington), Doc. 74–248, *Miss Mary C. Monckton* v. *LinkBelt Corp. and Syntron Sales Co., Inc.*

2,962,764, Trojanowski and Brandt, PROCESS FOR THE MANUFACTURE OF MOLDED ARTICLES; **2,962,767,** same, MOLDING PROCESS; **3,216,060,** same, APPARATUS FOR THE MANUFACTURE OF MOLDED ARTICLES; **3,566,833,** Beebe and Madeley, CONTINUOUS COATING APPARATUS, **filed** Apr. 23, 1971, D.C., S.D.N.Y., Doc. 71–C–1812, *Oceana International Inc.* v. *Seymour I. Richman.* Filed stipulation of discontinuance, Nov. 18, 1971.

2,962,767. (See 2,962,764).

3,200,396, Stevens and Moritz, CHARACTER READ-OUT DEVICE, **filed** Nov. 20, 1974, D.C., S.D.N.Y., Doc. 74–C–5093, *General Time Corporation* v. *Sankyo Seiki (America), Inc.*

3,204,417, S. H. Robley, UNDERWATER PIPE LAYING APPARATUS, **filed** Nov. 21, 1974, D.C. Hawaii (Honolulu), Doc. C–74–296, *Underwater Devices, Incorporated* v. *Morrison-Knudsen Company.*

3,216,060. (See 2,962,764.)

3,219,261, N. Laing. CROSS-FLOW ROTOR SUPPORT MEANS; **3,284,611,** same, PORTABLE HAIR DRYERS; **3,295,750,** same CROSS FLOW MACHINE; **3,305,665,** same, FORCED CIRCULATION ELECTRIC HEATER EMPLOYING CROSS-FLOW TYPE FAN; **3,308,268,** same, PORTABLE HAIR DRYERS; **3,310,228,** same, BLOWERS; **3,313,342,** same; **3,319,877,** Eck and Laing, MACHINES OF THE CROSS-FLOW TYPE FOR INDUCING MOVEMENT OF FLUID; **3,322,332,** N. Laing, CROSS FLOW MACHINE; **3,322,932,** same, PORTABLE ELECTRIC FAN HEATER; **3,348,020,** B. Copper, HAND-HELD ELECTRIC HAIR DRYER, **filed** Oct. 23, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c3048, *Schick Incorporated* v. *Firth Cleveland Ltd. et al.*

3,219,877. (See 3,219,261.)

3,284,611. (See 3,219,261.)

3,295,750. (See 3,219,261.)

3,296,636, B. Markwitz, BUOYANCY RING; **3,775,788,** same, INFLATABLE SWIMMING SUPPORTS; **Reg. No. 894,510** (BEMA), Bernhard Markwitz, **filed** Nov. 29, 1974, D.C., S.D. Fla. (Miami), Doc. 74–1557–C–JE, *Bernhard Markwitz* v. *Ronald A. Hirst, etc. and Be-Mar USA, Inc.*

3,305,665. (See 3,219,261.)

3,308,268. (See 3,219,261.)

3,310,268. (See 3,219,261.)

3,313,342. (See 3,219,261.)

3,319,872, Beckman and Beerbohm, MAILER, **filed** June 28, 1974, D.C.N.J. (Newark), Doc. 74–983, *Jonergin, Inc.* v. *2B System Corporation.* Consent order transferring action to the Eastern District of New York, Dec. 2, 1974.

3,322,332. (See 3,219,261.)

3,322,932. (See 3,219,261.)

3,348,020. (See 3,219,261.)

3,499,127, Cherry and Long, THUMBWHEEL TYPE SWITCH; **Reg. No. 855,226** (VANDA), Dart Industries Inc., **filed** July 24, 1974, D.C., C.D. Calif. (Los Angeles), Doc. CV–74–2117, *Cherry Electrical Products Corporation* v. *Becton, Dickinson Electronics Company.*

3,543,760, L. R. Bolduc, DISPOSABLE GROUND PLATE ELECTRODE; **3,699,968,** same, ELECTRICAL CONNECTOR AND PLATE ELECTRODE; **3,720,209,** same, PLATE ELECTRODE, **filed** Dec. 2, 1974, D.C. Minn. (Minneapolis). Doc. 4–74–617. *Electro Medical Systems, Inc.* v. *Medical Plastics, Inc. and Lee R. Bolduc.*

3,559,887, L. P. Meyer, SPRINKLER HEAD, **filed** Dec. 3, 1974, D.C., S.D. Ill. (Peoria), Doc. P–C–74–155, *Nelson Irrigation Corp.* v. *Rain Bird Eastern Sales Corp.*

3,566,833. (See 2,962,764.)

3,583,340, Dahl and Robier, PATTERN MEANS, PATTERN-FOLLOWING MEANS, AND SERVO MEANS CONTROLLED THEREBY, **filed** Feb. 21, 1974, D.C., C.D. Calif. (Los Angeles), Doc. 74–473–R, *Frank L. Dahl* v. *Kirsch Co., Idamatic, Inc. and McClintock Idamatic, Inc.* Filed order of dismissal without prejudice to the right to reopen the action within 40 days if settlement is not consummated, Entered Nov. 26, 1974.

3,611,910, J. S. Hughes, CORN POPPER, **filed** Nov. 29, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c3460, *Ropat Corp.* v. *Hyland Electrical Supply Company.*

3,630,505, B. R. MacKay, SILVER RECOVERY; **3,744,995,** same, **filed** June 11, 1974, D.C. Colo. (Denver), Doc. 74–M–510, *Byron R. MacKay* v. *C. & S., Inc.* Stipulation and consent decree entered on Nov. 13, 1974.

3,642,045, J. Buvelot, CHEESE-GRATING DEVICE, **filed** June 26, 1974, D.C.N.J. (Newark), Doc. 74–959, *Jacques Buvelot* v. *Acme Metal Goods Mfg. Co.* Stipulation and order of dismissal of action, Dec. 2, 1974.

3,654,579, Kurtz, Mallon and Gravel, ELECTRO-MECHANICAL TRANSDUCERS AND HOUSINGS; **3,706,953,** Kicks and Louth, PARTICLE IMPACT PROTECTORS AND ASSEMBLIES THEREOF FOR PRESSURE SENSING TRANSDUCERS HAVING DIAPHRAGMS; **3,753,196,** Kurtz, Gravel and Mallon, Jr., TRANSDUCERS EMPLOYING INTEGRAL PROTECTIVE COATINGS AND SUPPORTS, **filed** Nov. 26, 1974, D.C.N.J. (Newark), Doc. 74–1847, *Kulite Semiconductor Products, Inc.* v. *Entran Devices, Inc.*

3,693,818, R. E. Teagarden, TRAILER STAND FOR INSTALLING AUTOMOBILE MUFFLER, **filed** Nov. 27, 1974, D.C., C.D. Calif. (Los Angeles), Doc. 74–3474–WMB, *ARP Sales Inc.* v. *Raymond E. Teagarden, doing business as Mobile Muffler Man.*

3,699,968. (See 3,543,760.)

3,706,608, R. L. Geisler, COMBUSTION TAILORING OF SOLID PROPELLANTS BY OXIDIZER ENCASEMENT, **filed** Dec. 3, 1974, D.C., E.D. Mich. (Detroit), Doc. 74–72884, *C & P Industries, Inc.* v. *Weld-Loc Systems.*

3,706,953. (See 3,654,579.)

3,720,209. (See 3,543,760.)

3,744,995. (See 3,630,505.)

3,753,196. (See 3,654,579).

3,766,851, Sirvet, Skrypek and Whelan, CONTINUOUS CAN PRINTER AND HANDLING APPARATUS, **filed** Dec. 3, 1974, D.C.N.J. (Newark), Doc. 74–1895, *Sun Chemical Corporation* v. *Van Vlaanderen Container Machinery, Inc.*

3,775,788. (See 3,296,636).

3,809,429, G. L. Channell, SCISSOR FRAME ASSEMBLY, **filed** Nov. 20, 1974, D.C. Kans. (Wichita), Doc. 74–227–C6, *Hydraulics Unlimited Manufacturing Co.* v. *Doonan Trailer Corp., Inc. and Doonan Truck & Equipment, Inc.*

Re. 27,990, Rivard and Harley, REFRIGERATORS, **filed** Nov. 8, 1974, D.C. Iowa (Cedar Rapids), Doc. C74–57, *Amana Refrigeration, Inc.* v. *White Consolidated Industries, Inc.* Same, **filed** Nov. 22, 1974. D.C., N.D. Ill. (Chicago), Doc. 74c3412, *White Consolidated Industries, Inc.* v. *Amana Refrigeration, Inc.*

D. 213,843, M. K. Summers, CLOCK FACE, **filed** Aug. 31, 1970, D.C. Kans. (Wichita), Doc. W–4430, *Marion K. Summers and Marion Kay Company, Inc.* v. *James V. Laubach, Century Manufacturing, Incorporated.* Judgment ordering the defendant's motion for summary judgment is granted against the plaintiffs, Nov. 11, 1974.

Reg. No. 855,226. (See 3,499,127.)

Reg. No. 894,510. (See 3,296,636.)

Certificates of Correction for the Week of Apr. 15, 1975

D. 233,812	3,821,567	3,853,137	3,860,813
D. 233,911	3,824,250	3,853,581	3,861,115
Re. 28,218	3,824,357	3,853,735	3,861,124
3,360,158	3,827,220	3,853,774	3,861,401
3,636,169	3,827,883	3,853,839	3,861,465
3,636,720	3,827,951	3,854,946	3,861,574
3,639,988	3,832,132	3,855,158	3,861,642
3,678,119	3,832,392	3,855,251	3,861,784
3,698,635	3,832,400	3,855,283	3,861,871
3,706,604	3,832,844	3,855,300	3,862,045
3,715,435	3,833,234	3,855,372	3,862,504
3,732,323	3,833,547	3,855,519	3,862,581
3,740,265	3,834,888	3,855,791	3,862,706
3,745,587	3,836,446	3,855,812	3,862,814
3,752,068	3,837,320	3,855,923	3,863,001
3,758,824	3,838,117	3,856,487	3,863,038
3,759,979	3,838,832	3,856,767	3,863,125
3,767,437	3,840,408	3,857,053	3,863,337
3,768,330	3,841,774	3,857,141	3,863,396
3,772,030	3,841,995	3,857,195	3,863,726
3,777,033	3,844,522	3,857,247	3,863,886
3,778,893	3,844,542	3,857,595	3,863,902
3,779,081	3,845,002	3,857,727	3,863,985
3,779,293	3,845,964	3,857,748	3,863,997
3,782,947	3,846,315	3,857,897	3,864,071
3,784,930	3,846,416	3,857,922	3,864,083
3,785,844	3,846,466	3,858,189	3,864,162
3,786,371	3,846,992	3,858,444	3,864,398
3,793,136	3,847,546	3,859,034	3,864,462
3,793,399	3,847,896	3,859,058	3,864,524
3,798,913	3,848,133	3,859,076	3,864,575
3,802,632	3,848,171	3,859,124	3,865,460
3,806,836	3,849,475	3,859,148	3,865,471
3,808,277	3,849,569	3,859,388	3,865,546
3,809,701	3,849,582	3,859,470	3,865,567
3,811,043	3,849,657	3,859,491	3,865,791
3,813,402	3,849,682	3,859,600	3,865,983
3,816,475	3,850,004	3,859,685	3,866,470
3,817,425	3,850,698	3,860,076	3,866,545
3,818,039	3,850,867	3,860,422	3,866,726
3,819,709	3,851,439	3,860,568	3,866,773
3,820,079	3,851,503	3,860,724	
3,820,863	3,851,960	3,860,726	
3,821,329	3,852,136	3,860,769	

National Technical Information Service

GOVERNMENT-OWNED INVENTIONS

Notice of Availability for Licensing

The inventions listed below are owned by the U.S. Government and are available for licensing in accordance with the licensing policy of each agency-sponsor.

Copies of patents are available from the Commissioner of Patents, Washington, D.C. 20231, at $0.50 each. Requests for copies of patents must include the patent number.

Copies of patent applications, either paper copy (PC) or microfiche (MF), can be purchased from the National Technical Information Service (NTIS), Springfield, Va. 22161, at the prices cited. Requests for copies of patent applications must include the patent application number. Claims are deleted from patent application copies sold to the public to avoid premature disclosure in the event of an interference before the Patent Office. Claims and other technical data can usually be made available to serious prospective licensees by the agency which filed the case.

Requests for licensing information should be directed to the address cited below for each agency.

DOUGLAS J. CAMPION,
Patent Progress Coordinator, National Technical Information Service.

DEPARTMENT OF THE NAVY
Assistant Chief for Patents, Office of Naval Research, Arlington, Va. 22217

Patent 3,756,180. Deep Submergence Container Lid Seal. Filed Mar. 27, 1972. Patented Sept. 4, 1973. Not available NTIS.

Patent 3,756,320. Fire Detection and Suppression System for Use in a Decompression Chamber. Filed July 20, 1972. Patented Sept. 4, 1973. Not available NTIS.

Patent 3,756,540. Minimum Drag Circulation Profile. Filed Aug. 6, 1971. Patented Sept. 4, 1973. Not available NTIS.

Patent 3,756,756. Pressure Mold for Removing Liquid From Material Being Cast. Filed May 25, 1972. Patented Sept. 4, 1973. Not available NTIS.

Patent 3,756,874. Temperature Resistant Propellants Containing Cyclotetramethylenetetranitramine. Filed July 1, 1969. Patented Sept. 4, 1973. Not available NTIS.

Patent 3,756,887. Method of Making Microfuses on a Thin Film Circuitry Panel. Filed July 29, 1971. Patented Sept. 4, 1973. Not available NTIS.

Patent 3,757,042. Pan and Tilt Underwater Optical Viewing System With Adjustable Source-Receiver Separation and Zoom Lenses. Filed Feb. 18, 1972. Patented Sept. 4, 1973. Not available NTIS.

Patent 3,757,247. Frequency Selective Optical Isolator. Filed June 22, 1972. Patented Sept. 4, 1973. Not available NTIS.

U.S. ATOMIC ENERGY COMMISSION
Assistant General Counsel for Patents
Washington, D.C. 20545

Patent application 487,327. Tissue Irradiator. Filed July 10, 1974. PC $3.25/MF $2.25.

Patent 3,801,446. Radioisotope Fueled Heat Transfer System. Filed June 5, 1968. Patented Apr. 2, 1974. Not available NTIS.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE,
National Institutes of Health, Chief, Patent Branch,
Bethesda, Md. 20014

Patent application 512,622. Scanning Ultrasonic Spectrograph for Fluid Analysis. Filed Oct. 7, 1974. PC $3.25/MF $2.25.

Patent application 513,565. Esters of Aromatic Sulfonic Acids. Filed Oct. 10, 1974. PC $3.25/MF $2.25.

Patent 3,844,894. Apparatus for Performing Assays on Reactions That Produce Radioactive Gases. Filed Aug. 30, 1971. Patented Oct. 29, 1974. Not available NTIS.

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
Assistant General Counsel for Patents,
Washington, D.C. 20545

Patent application 474,548. Radioisotopic Heat Source. Filed May 30, 1974. PC $3.25/MF $2.25.

Patent application 474,556. A Moving Foil Stripper for a Particle Accelerator. Filed May 30, 1974. PC $3.25/MF $2.25.

Patent application 481,285. Method of Preparing an Electrode of Lithium-Aluminum Alloy. Filed June 20, 1974. PC $3.25/MF $2.25.

Patent application 481,421. Multi-Layer Monochromator. Filed June 20, 1974. PC $3.25/MF $2.25.

Patent application 481,422. Volumetric Dispenser for Small Particles. Filed June 20, 1974. PC $3.25/MF $2.25.

Patent application 493,007. Miniature Igniter. Filed July 30, 1974. PC $3.25/MF $2.25.

Patent 3,801,446. Radioisotope Fueled Heat Transfer System. Filed June 5, 1968. Patented Apr. 2, 1974. Not available NTIS.

U.S. DEPARTMENT OF AGRICULTURE
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Patent application 509,610. Lightweight Truss-Framed House and Method of Building Same. Filed Sept. 26, 1974. PC $3.25/MF $2.25.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE,
National Institutes of Health, Chief, Patent Branch,
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Patent application 512,621. Thermo-Setting Radiation Sensing Polymer. Filed Oct. 7, 1974. PC $3.75/MF $2.25.

DEPARTMENT OF THE NAVY
Assistant Chief for Patents, Office of Naval Research, Code 302,
Arlington, Va. 22217

Patent 3,757,247. Frequency Selective Optical Isolator. Filed June 22, 1972. Patented Sept. 4, 1973. Not available NTIS.

Patent 3,754,440. Helicopter Lift Margin Determining System. Filed Aug. 16, 1972. Patented Aug. 28, 1973. Not available NTIS.

Patent 3,757,720. Control Surfaces for Submersible Vehicles. Filed Oct. 19, 1971. Patented Sept. 11, 1973. Not available NTIS.

Patent 3,757,722. Submersible Submersible Underway Docking Unit. Filed Apr. 21, 1972. Patented Sept. 11, 1973. Not available NTIS.

Patent 3,757,725. Right Spherical Segment-Glass Shell-To-Metal-Joint. Filed Sept. 24, 1971. Patented Sept. 11, 1973. Not available NTIS.

Patent 3,757,854. Horizontal Bottom-Freezing Apparatus. Filed June 24, 1971. Patented Sept. 11, 1973. Not available NTIS.

Patent 3,759,559. Universal Extractor Tool. Filed July 10, 1972. Patented Sept. 18, 1973. Not available NTIS.

Patent 3,759,706. High-Toughness Alloy Steel With Improved Weldability. Filed Feb. 23, 1972. Patented Sept. 18, 1973. Not available NTIS.

Patent 3,759,970. Thermal Stabilizers for Silicone Fluids. Filed Dec. 10, 1971. Patented Sept. 18, 1973. Not available NTIS.

Patent 3,760,215. Low-Reflection Filter for Cathode Ray Tube Face Plate. Filed Aug. 22, 1972. Patented Sept. 18, 1973. Not available NTIS.

Patent 3,760,293. Continuous Wave, Free-Burning Flame Laser. Filed Feb. 24, 1972. Patented Sept. 18, 1973. Not available NTIS.

Patent 3,760,298. Circuit for Suppressing Leakage Currents Flowing Into an Underground Cable Sheath. Filed July 5, 1972. Patented Sept. 18, 1973. Not available NTIS.

Patent 3,760,345. Adapting Circular Shading to a Truncated Array of Square Elements. Filed Aug. 28, 1972. Patented Sept. 18, 1973. Not available NTIS.

Patent 3,760,346. High-Power Underwater Electroacoustic Transducer for the Infrasonic and Low Audio-Frequency Range. Filed May 8, 1972. Patented Sept. 18, 1973. Not available NTIS.

Patent 3,760,755. Guidance System for Straight Running Vehicles. Filed Sept. 20, 1971. Patented Sept. 25, 1973. Not available NTIS.

Patent 3,762,169. Floating Water Jet for Oil Slick Control. Filed Aug. 23, 1972. Patented Oct. 2, 1973. Not available NTIS.

Patent 3,762,695. Shock Absorber. Filed Jan. 19, 1972. Patented Oct. 2, 1973. Not available NTIS.

Patent 3,762,961. Production of Vacancies in Metals by Laser Bombardment. Filed Feb. 22, 1972. Patented Oct. 2, 1973. Not available NTIS.

Patent 3,763,436. Amplitude Independent Time of Arrival Detector. Filed Dec. 27, 1971. Patented Oct. 2, 1973. Not available NTIS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Assistant General Counsel for Patent Matters, NASA—Code GP–2, Washington, D.C. 20546

Patent application 517,995. Flanged Major Modular Assembly Jug. Filed Oct. 25, 1974. PC $3.75/MF $2.25.

Patent application 518,544. Solar Energy Trap. Filed Oct. 29, 1974. PC $3.25/MF $2.25.

Patent application 518,684. Solar Energy Absorber. Filed Oct. 29, 1974. PC $3.25/MF $2.25.

Patent application 521,817. An Indicator Providing Continuous Indication of the Presence of a Specific Pollutant in Air. Filed Nov. 7, 1974. PC $3.25/MF $2.25.

Patent application 522,551. Method and Apparatus for Measurement of Trap Density and Energy Distribution in Dielectric Films. Filed Nov. 11, 1974. PC $3.25/MF $2.25.

Patent application 522,552. Magnetometer Using a Superconducting Rotating Body. Filed Nov. 11, 1974. PC $3.25/MF $2.25.

Patent application 522,556. Ultrasonic Calibration Device. Filed Nov. 11, 1974. PC $3.25/MF $2.25.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE,

National Institutes of Health, Chief, Patent Branch, Westwood Bldg., Bethesda, Md. 20014

Patent application 490,995. Isolation and Purification of Active Principle of Fruit of "Synsepalum Dulcificum" and Method of Treatment of Obesity. Filed July 23, 1974. PC $3.25/MF $2.25.

Patent application 513,871. Heat Engine. Filed Oct. 10, 1974. PC $3.25/MF $2.25.

Patent 3,841,310. Electrode Insertion Device for Neuroelectrical Recordings. Filed Apr. 4, 1973. Patented Oct. 15, 1974. Not available NTIS.

Patent 3,847,822. Asymmetric Membrane of Polyvinyl Pyrrolidone-Cellulose Acetate Blends for Use as Hemodialysis Membranes. Filed May 24, 1972. Patented Nov. 12, 1974. Not available NTIS.

DEPARTMENT OF THE NAVY

Assistant Chief for Patents, Office of Naval Research, Code 302, Arlington, Va. 22217

Patent 3,761,809. Noise Modulated Analogue Signal Presence Detector. Filed Apr. 27, 1970. Patented Sept. 25, 1973. Not available NTIS.

Patent 3,763,492. Apparatus and Method for Improving Sensitivity of Navigation System Using Earth Satellites. Filed Oct. 8, 1970. Patented Oct. 2, 1973. Not available NTIS.

Patent 3,765,746. Infrared Germanium Film Polarizer. Filed July 26, 1971. Patented Oct. 16, 1973. Not available NTIS.

Patent 3,765,765. Optical Ranging Device. Filed Dec. 27, 1971. Patented Oct. 16, 1973. Not available NTIS.

Patent 3,765,855. Electro-Ionic Method of Strenghening Glass. Filed Dec. 30, 1971. Patented Oct. 16, 1973. Not available NTIS.

Patent 3,766,074. Magnetically Pigmented Paint. Filed Sept. 15, 1972. Patented Oct. 16, 1973. Not available NTIS.

Patent 3,766,141. Polyquinoxalines Containing Flexibilizing Groups in the Polymer Chain. Filed Sept. 27, 1971. Patented Oct. 16, 1973. Not available NTIS.

Patent 3,766,316. Frame Synchronization Detector. Filed May 3, 1972. Patented Oct. 16, 1973. Not available NTIS.

Patent 3,766,466. Device for Simultaneously Q-Switching Several Independent Ruby Lasers. Filed Nov. 26, 1971. Patented Oct. 16, 1973. Not available NTIS.

Patent 3,766,478. Backscatter. Reduction Apparatus. Filed Sept. 8, 1972. Patented Oct. 16, 1973. Not available NTIS.

Patent 3,766,493. Holding Cladding for Laser Slabs. Filed Sept. 26, 1972. Patented Oct. 16, 1973. Not available NTIS.

Patent 3,766,496. Feedback-Type Acoustic Surface Wave Device. Filed Feb. 4, 1971. Patented Oct. 16, 1973. Not available NTIS.

Patent 3,766,561. High Resolution Aircraft Radar Antenna. Filed Dec. 30, 1969. Patented Oct. 16, 1973. Not available NTIS.

Patent 3,766,945. Fluidic System for Mixing Two Fluids. Filed Apr. 21, 1972. Patented Oct. 23, 1973. Not available NTIS.

Patent 3,767,139. Spacecraft Spin Stabilization System. Filed June 21, 1971. Patented Oct. 23, 1973. Not available NTIS.

Patent 3,767,928. Two-Dimensional Imaging Array of Chalcogenide Glass Bolometers. Filed June 8, 1972. Patented Oct. 23, 1973. Not available NTIS.

Patent 3,768,155. Method of Making Epoxy Tunnel Structure for Plated Wire Memories. Filed Aug. 11, 1972. Patented Oct. 30, 1973. Not available NTIS.

Patent 3,768,265. Cofferdam. Filed Sept. 27, 1971. Patented Oct. 30, 1973. Not available NTIS.

Patent 3,768,907. Scanning Aperture Partially Coherent Optical Correlator. Filed July 17, 1972. Patented Oct. 30, 1973. Not available NTIS.

Patent 3,769,091. Shingled Array of Solar Cells. Filed Mar. 31, 1972. Patented Oct. 30, 1973. Not available NTIS.

Patent 3,769,107. Pyrotechnic Composition for Generating Lead Based Smoke. Filed Oct. 28, 1968. Patented Oct. 30, 1973. Not available NTIS.

Patent 3,769,227. Chemiluminescent Formulation of Increased Light Output. Filed May 27, 1968. Patented Oct. 30, 1973. Not available NTIS.

Patent 3,769,561. Current Limiting Integrated Circuit. Filed Feb. 24, 1972. Patented Oct. 30, 1973. Not available NTIS.

Patent 3,769,633. Raindrop Image Recording Analyzer System. Filed May 11, 1972. Patented Oct. 30, 1973. Not available NTIS.

Patent 3,769,833. Bubble Generator. Filed May 30, 1972. Patented Nov. 6, 1973. Not available NTIS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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Patent application 521,620. Annular Arc Accelerator Shock Tube. Filed Nov. 6, 1974. PC $3.25/MF $2.25.

Patent 3,847,208. Structural Heat Pipe. Patented Nov. 12, 1974. Not available NTIS.

Patent 3,847,652. Method of Preparing Water Purification Membranes. Patented Nov. 12, 1974. Not available NTIS.

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

Assistant General Counsel for Patents, Washington, D.C. 20545

Patent application 493,006. Whole Blood Analysis Rotor Assembly Having Removable Cellular Sedimentation Bowl. Filed July 30, 1974. PC $3.25/MF $2.25.

Patent application 501,899. Ultrasonic-Acoustic Grinding Wheel Setting Station for Automatic Numerically-Controlled Machines. Filed Aug. 30, 1974. PC $3.25/MF $2.25.

Patent 3,823,029. Method for Coating Graphite Filaments With Refractory Metal Carbides. Filed Aug. 1, 1972. Patented July 9, 1974. Not available NTIS.

Patent 3,823,037. Implantable Battery. Filed July 20, 1972. Patented July 9, 1974. Not available NTIS.

Patent 3,824,402. Dual Parameter Flow Photometric Apparatus and Method. Filed June 4, 1973. Patented July 16, 1974. Not available NTIS.

Patent 3,825,653. Process for Preparing Sinterable Aluminum Titanate Powder. Filed Sept. 11, 1972. Patented July 23, 1974. Not available NTIS.

Patent 3,827,946. Method for the Disposal of Combustible and Dilute Aqueous Wastes. Filed June 5, 1972. Patented Aug. 6, 1974. Not available NTIS.

Patent 3,829,552. Method of Massively Hydriding Zirconium-Uranium Alloy. Filed Oct. 12, 1962. Patented Aug. 13, 1974. Not available NTIS.

Patent 3 830,292. Flow Distribution for Heat Exchangers. Filed May 1, 1972. Patented Aug. 20, 1974. Not available NTIS.

Patent 3,832,426. Syntactic Carbon Foam. Filed Dec. 19, 1972. Patented Aug. 27, 1974. Not available NTIS.

Patent 3,832,801. Fertile Interspecific Hydridization Cell Fusion for Higher Plants. Filed May 8, 1973. Patented Sept. 3, 1974. Not available NTIS.

Patent 3,832,873. Multiple Code Coded Mechanism. Filed Aug. 6, 1973. Patented Sept. 3, 1974. Not available NTIS.

Patent 3,836,404. Method of Fabricating Composite Superconductive Electrical Conductors. Filed June 28, 1972. Patented Sept. 17, 1974. Not available NTIS.

Patent 3,836,407. High Strength and High Toughness Alloy. Filed May 2, 1972. Patented Sept. 17, 1974. Not available NTIS.

Patent 3,837,066. Method of Extruding Aluminum Coated NB–TI. Filed Feb. 14, 1973. Patented Sept. 24, 1974. Not available NTIS.

U.S. DEPARTMENT OF AGRICULTURE
Research Agreements and Patent Mgt. Branch,
General Services Division, Federal Bldg.,
Agricultural Research Service,
Hyattsville, Md. 20782

Patent application 510,976. Method and Apparatus for Spraying Wood Chips With Preservative. Filed Oct. 1, 1974. PC $3.25/MF $2.25.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE,
National Institutes of Health, Chief, Patent Branch,
Westwood Bldg., Bethesda, Md. 20014

Patent 3,852,432. Diagnostic Device and Method of Treatment. Filed Aug. 21, 1972. Patented Dec. 3, 1974. Not available NTIS.

Patent 3,854,050. High Precision Fluorometer for Measuring Enzymatic Substrates in Tissue. Filed Sept. 11, 1973. Patented Dec. 10, 1974. Not available NTIS.

Patent 3,854,561. Unidirectional Slip Clutch. Filed May 9, 1973. Patented Dec. 17, 1974. Not available NTIS.

U.S. DEPARTMENT OF THE NAVY
Assistant Chief for Patents, Office of Naval Research, Code 302,
Arlington, Va. 22217

Patent 3,769,844. Solid State Acceleration Counter. Filed Apr. 29, 1972. Patented Nov. 6, 1973. Not available NTIS.

Patent 3,770,353. Electro-Optical Sensor. Filed Aug. 25, 1971. Patented Nov. 6, 1973. Not available NTIS.

Patent 3,770,565. Plastic Mounting of Epitaxially Grown IV–VI Compound Semiconducting Films. Filed Jan. 5, 1972. Patented Nov. 6, 1973. Not available NTIS.

Patent 3, 770,884. Luminance Control Circuit for Multi-Color Periscope View Simulator. Filed May 4, 1972. Patented Nov. 6, 1973. Not available NTIS.

Patent 3,770,885. Color Electronic Periscope View Simulator. Filed Oct. 21, 1971. Patented Nov. 6, 1973. Not available NTIS.

Patent 3,770,887. Color Stereo Television. Filed Jan. 31, 1972. Patented Nov. 6, 1973. Not available NTIS.

Patent 3,770,949. Acoustic Surface Wave Correlators and Convolvers. Filed Apr. 21, 1972. Patented Nov. 6, 1973. Not available NTIS.

Patent 3,771,010. Liquid Cooled Band Edge Oscillation Prevention for a TWT. Filed Nov. 22, 1972. Patented Nov. 6, 1973. Not available NTIS.

Patent 3,777,274. Electronic Interaction Guide Structure for Acoustic Surface Waves. Filed Jan. 18, 1972. Patented Dec. 4, 1973. Not available NTIS.

Patent 3,776,093. Muzzle Blast Suppressor. Filed Nov. 13, 1969. Patented Dec. 4, 1973. Not available NTIS.

Patent 3,776,361. Acoustic Lens. Filed Apr. 6, 1972. Patented Dec. 4, 1973. Not available NTIS.

Patent 3,776,493. Parachute Decoupling Apparatus. Filed Sept. 11, 1972. Patented Dec. 4, 1973. Not available NTIS.

Patent 3,776,641. Optical Divider Point Assembly for Harmonic Spectrum Analysis. Filed Jan. 27, 1972. Patented Dec. 4, 1973. Not available NTIS.

Patent 3,777,064. Voice Privacy System. Filed June 1, 1972. Patented Dec. 4, 1973. Not available NTIS.

Patent 3,777,276. Phase Lock Loop With Automatic Step by Step Search Sweep Followed by Linear Search Sweep. Filed Jan. 24, 1973. Patented Dec. 4, 1973. Not available NTIS.

Patent 3,777,277. Discrete Step Frequency Sweep. Filed Feb. 23, 1973. Patented Dec. 4, 1973. Not available NTIS.

Patent 3,777,282. Metal Vapor Laser Tube. Filed Feb. 3, 1972. Patented Dec. 4, 1973. Not available NTIS.

Patent 3,777,284. Directional Phase-Shifting Coupler. Filed Mar. 27, 1972. Patented Dec. 4, 1973. Not available NTIS.

Patent 3,777,555. Cumulative Fatigue Life Indicator. Filed May 3, 1972. Patented Dec. 11, 1973. Not available NTIS.

Patent 3,777,564. Electrogasdynamic Spectral Anemometer. Filed Dec. 27, 1971. Patented Dec. 11, 1973. Not available NTIS.

Patent 3,777,643. Area Source of Collimated Light and Scanning Mechanism. Filed Apr. 24, 1972. Patented Dec. 11, 973. Not available NTIS.

Patent 3,777,688. Method and Apparatus for Emplacement of Long Beams in Rugged Sea Bottom Areas. Filed June 25, 1970. Patented Dec. 11, 1973. Not available NTIS.

Patent 3,778,354. Use of Cobalt in a Nonorganic Copper Sulfate Electroplating Bath. Filed Sept. 13, 1972. Patented Dec. 11, 1973. Not available NTIS.

Patent 3,778,635. Liquid Parametric Optical Mixing Device. Filed June 8, 1972. Patented Dec. 11, 1973. Not available NTIS.

Patent 3,778,758. Transducers. Filed Sept. 25, 1972. Patented Dec. 11, 1973. Not available NTIS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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Patent application 521,601. Multi-Computer Multiple Data Path Hardware Exchange System. Filed Nov. 6, 1974. PC $3.75/MF $2.25.

Patent application 522,557. A Self-Lubricating Bearing. Filed Nov. 11, 1974. PC $3.25/MF $2.25.

Patent application 526,438. Nulling Device for Detection of Trace Gases by Ndir Absorption. Filed Nov. 22, 1974. PC $3.25/MF $2.25.

Patent application 526,448. Thermostatically Controlled Non-tracking Type Solar Energy Concentrator. Filed Nov. 22, 1974. PC $3.25/MF $2.25.

Patent application 526,450. Thermocouple Installation. Filed Nov. 22, 1974. PC. $3.25/MF $2.25.

Patent application 527,727. Deploy/Release System. Filed Nov. 27, 1974. PC $3.25/MF $2.25.

Patent 3,841,973. Apparatus for Microbiological Sampling. Patented Oct. 15, 1974. Not available NTIS.

Patent 3,842,485. Method of Making an Explosively Welded Scarf Joint. Patented Oct. 22, 1974. Not available NTIS.

Patent 3,842,509. Strain Gauge Ambiguity Sensor for Segmented Mirror Active Optical System. Patented Oct. 22, 1974. Not available NTIS.

Patent 3,842,656. Determining Particle Density Using Known Material Hugeniot Curves. Patented Oct. 22, 1974. Not available NTIS.

Patent 3,846,243. Automated Analysis of Oxidative Metabolites. Patented Nov. 5, 1974. Not available NTIS.

Patent 3,847,115. System for Depositing Thin Films. Patented Nov. 12, 1974. Not available NTIS.

Patent 3,847,141. Ultrasonic Bone Densitometer. Patented Nov. 12, 1974. Not available NTIS.

Patent 3,847,689. Method of Forming Aperture Plate for Electron Microscope. Patented Nov. 12, 1974. Not available NTIS.

Patent 3,848,190. Signal Conditioner Test Set. Patented Nov. 12, 1974. Not available NTIS.

Patent 3,849,668. Orthotic ARM Joint. Patented Nov. 19, 1974. Not available NTIS.

U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
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Patent application 491,088. Method and Apparatus for Sampling Atmospheric Mercury. Filed July 23, 1974. PC $3.25/MF $2.25.

Patent application 501,726. Method for Utilizing Decay Heat From Radioactive Nuclear Wastes. Filed Aug. 29, 1974. PC $3.25/MF $2.25.

Patent 3,581,090. Utilizing Penetrating Radiation. Filed Oct. 20, 1966. Patented May 25, 1971. Not available NTIS.

Patent 3,822,185. Fuel Element for a Compact Power Reactor. Filed Mar. 28, 1961. Patented July 2, 1974. Not available NTIS.

Patent 3,825,418. Alloys for Isolation of Hydrogen. Filed Jan. 30, 1973. Patented July 23, 1974. Not available NTIS.

Patent 3,825,499. Fueled Moderator Composition. Filed July 7, 1950. Patented July 23, 1974. Not available NTIS.

Patent 3,825,649. Process for Separation of Protactinium, Thorium and Uranium From Neutron-Irradiated Thorium. Filed Aug. 7, 1956. Patented July 23, 1974. Not available NTIS.

Patent 3,825,650. Decontaminating Uranium by Reaction With ClF_3 and HF and Volatizing the UF_6 Product. Filed June 18, 1954. Patented July 23, 1974. Not available NTIS.

Patent 3,826,678. Method for Preparation of Biocompatible and Biofunctional Materials and Product Thereof. Filed June 6, 1972. Patented July 30, 1974. Not available NTIS.

Patent 3,826,753. Stabilized Uranyl Nitrate Compositions and Uranium Impregnation Method. Filed Oct. 24, 1958. Patented July 30, 1974. Not available NTIS.

Patent 3,827,989. Impregnated Chemical Separation Particles. Filed Nov. 13, 1972. Patented Aug. 6, 1974. Not available NTIS.

Patent 3,829,223. Mixing Rotor for Fast Analyzer of Rotary Curvette Type With Means for Enhancing the Mixing of Sample and Reagent Liquids. Filed July 20, 1973. Patented Aug. 13, 1974. Not available NTIS.

Patent 3,829,551. Atmosphere Purification of Xenon, Radon and Radon Daughter Elements. Filed Mar. 27, 1973. Patented Aug. 13, 1974. Not available NTIS.

Patent 3,829,793. Metal Atom Oxidation Laser. Filed Nov. 7, 1972. Patented Aug. 13, 1974. Not available NTIS.

Patent 3,831,028. Radiation Detector Using Electro-Optics. Filed June 26, 1973. Patented Aug. 20, 1974. Not available NTIS.

Patent 3,831,203. Implantable Blood Pumping System. Filed Sept. 28, 1973. Patented Aug. 27, 1974. Not available NTIS.

Patent 3,832,222. Chemical Vapor Deposition of Uranium and Plutonium. Filed Dec. 27, 1972. Patented Aug. 27, 1974. Not available NTIS.

Patent 3,833,581. Vapor Phase Substitution Fluorination of Aromatics With Xenon Difluoride. Filed July 23, 1971. Patented Sept. 3, 1974. Not available NTIS.

Patent 3,835,008. Automatic Controlled-Current Coulometric Environmental Monitor. Filed Dec. 6, 1972. Patented Sept. 10, 1974. Not available NTIS.

Patent 3,835,044. Process for Separating Neptunium From Thorium. Filed Oct. 16, 1972. Patented Sept. 10, 1974. Not available NTIS.

Patent 3,835,122. Novel Polystyrene Product Having Rapid-Post-Irradiation Decay of Conductivity and Process of Making Same. Filed Apr. 25, 1973. Patented Sept. 10, 1974. Not available NTIS.

Patent 3,835,214. Oxidative Stripping Process for the Recovery of Uranium From Wet-Process Phosphoric Acid. Filed Aug. 15, 1972. Patented Sept. 10, 1974. Not available NTIS.

Patent 3,835,329. Method of Measuring Fast Neutron Flux Using Thermoluminescent Dosimeter. Filed Aug. 23, 1973. Patented Sept. 10, 1974. Not available NTIS.

Patent 3,836,865. Pyrotechnically Excited Laser System. Filed Jan. 10, 1973. Patented Sept. 17, 1974. Not available NTIS.

Patent 3,837,397. Tube Bundle Assembly. Filed Feb. 14, 1972. Patented Sept. 24, 1974. Not available NTIS.

U.S. DEPARTMENT OF COMMERCE
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Patent application 546,968. Ambient Pressure Probe. Filed Feb. 4, 1975. PC $3.25/MF $2.25.

Patent application 503,129. Method and Apparatus for Fire Testing Gypsum Boards and the Like. Filed Sept. 4, 1974. PC $3.25/MF $2.25.

Patent 3,795,812. Sulfur Dioxide Pollution Monitor. Filed Nov. 27, 1972. Patented Mar. 5, 1974. Not available NTIS.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE,
National Institutes of Health, Chief, Patent Branch,
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Patent application 498,280. Adjustable Microvascular U-Clamp. Filed Aug. 16, 1974. PC $3.25/MF $2.25.

Patent 3,856,669. Elution Centrifuge-Apparatus and Method. Filed July 2, 1973. Patented Dec. 24, 1974. Not available NTIS.

Patent 3,856,959. Inhibition of Leukemia Utilizing 5-Methyltetrahydrohomofolate. Filed July 24, 1972. Patented Dec. 24, 1974. Not available NTIS.

DEPARTMENT OF THE NAVY
Assistant Chief for Patents, Office of Naval Research,
Arlington, Va. 22217

Patent 3,778,814. Waveform Synthesizer. Filed Aug. 7, 1972. Patented Dec. 11, 1973. Not available NTIS.

Patent 3,778,830. Vibration Compensation for Range Direction Finder. Filed Aug. 24, 1972. Patented Dec. 11, 1973. Not available NTIS.

Patent 3,778,833. Magnetic-Electronic Position Encoder. Filed July 29, 1971. Patented Dec. 11, 1973. Not available NTIS.

Patent 3,779,195. Lift Cable Transfer Apparatus. Filed Jan. 12, 1970. Patented Dec. 18, 1973. Not available NTIS.

Patent 3,779,489. Controllable Gliding Parachute. Filed July 31, 1972. Patented Dec. 18, 1973. Not available NTIS.

Patent 3,779,708. Method and Means for Determining Oxyhemoglobin Association and Dissociation Curves of Whole Blood or Other Liquids. Filed Jan. 31, 1972. Patented Dec. 18, 1973. Not available NTIS.

Patent 3,779,939. Liquid Laser Solution Formed With a Neodymium Salt in Phosphorus Oxychloride. Filed Jan. 29, 1971. Patented Dec. 18, 1973. Not available NTIS.

Patent 3,780,220. Remote Control Underwater Observation Vehicle. Filed Aug. 14, 1972. Patented Dec. 18, 1973. Not available NTIS.

Patent 3,780,465. Wear Resistant Gun Barrel and Method of Making the Same. Filed June 1, 1972. Patented Dec. 25, 1973. Not available NTIS.

Patent 3,780,722. Fiber Optical Solar Collector. Filed Apr. 26, 1972. Patented Dec. 25, 1973. Not available NTIS.

Patent 3,781,536. Illuminated Diver's Slate. Filed Jan. 15, 1973. Patented Dec. 25, 1973. Not available NTIS.

Patent 3,781,588. Backward Wave Prevention for a TWT Helix. Filed Jan. 24, 1973. Patented Dec. 25, 1973. Not available NTIS.

Patent 3,781,706. Incremental Phase Shift Frequency Synthesizer. Filed Aug. 4, 1972. Patented Dec. 25, 1973. Not available NTIS.

Patent 3,781,748. Chalcogenide Glass Bolometer. Filed May 28, 1971. Patented Dec. 25, 1973. Not available NTIS.

Patent 3,781,775. Rotating Stereo Sonar Mapping and Positioning System. Filed May 1, 1972. Patented Dec. 25, 1973. Not available NTIS.

Patent 3,781,780. Neutrally Buoyant Instrument Suspension. Filed July 17, 1972. Patented Dec. 25, 1973. Not available NTIS.

Patent 3,781,781. Piezoelectric Transducer. Filed July 21, 1972. Patented Dec. 25, 1973. Not available NTIS.

Patent 3,781,786. Coded Track Marker Light. Filed Sept. 5, 1972. Patented Dec. 25, 1973. Not available NTIS.

Patent 3,781,911. Apparatus for Monitoring Thickness of Evaporated Film. Filed Mar. 22, 1973. Patented Dec. 25, 1973. Not available NTIS.

Patent 3,782,112. Hybrid Generator. Filed Feb. 24, 1972. Patented Jan. 1, 1974. Not available NTIS.

Patent 3,783,402. Josephson Junction Amplifier. Filed June 28, 1972. Patented Jan. 1, 1974. Not available NTIS.

Patent 3,783,447. Three Dimensional Radar Transponder System. Filed Sept. 21, 1972. Patented Jan. 1, 1974. Not available NTIS.

Patent 3,783,505. Method for Electrically Insulating Magnetostrictive Material. Filed Mar. 29, 1972. Patented Jan. 8, 1974. Not available NTIS.

Patent 3,783,524. Underwater Angle Measuring Device. Filed Dec. 7, 1971. Patented Jan. 8, 1974. Not available NTIS.

Patnt 3,784,312. Flotation Beam for Matting Construction. Filed June 12, 1972. Patented Jan. 8, 1974. Not available NTIS.

Patent 3,784,357. Protective Surfaces or Liners for Subaqueous Structures. Filed Jan. 13, 1972. Patented Jan. 8, 1974. Not available NTIS.

Patent 3,784,805. Sonar Image Converter. Filed Oct. 4, 1972. Patented Jan. 8, 1974. Not available NTIS.

Patent 3,789,128. Multipath Sonar Simulator. Filed Feb. 22, 1971. Patented Jan. 29, 1974. Not available NTIS.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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Patent application 505,819. Fine Frequency Measurement by Coincidence Detection. Filed Sept. 13, 1974. PC $3.25/MF $2.25.

Patent application 521,619. Water Purification Process. Filed Nov. 6, 1974. PC $3.25/MF $2.25.

Patent application 521,816. Fluid Mass Sensor. Filed Nov. 7, 1974. PC $3.25/MF $2.25.

Patent application 522,971. Self-Contained Breathing Apparatus. Filed Nov. 11, 1974. PC $3.25/MF $2.25.

Patent application 526,449. Automatic Biowaste Sampling. Filed Nov. 22, 1974. PC $3.25/MF $2.25.

Patent application 531,565. Fiber Distributed Feedback Laser. Filed Dec. 11, 1974. PC $3.25/MF $2.25.

Patent application 531,572. Traffic Survey System. Filed Dec. 11, 1974. PC $3.25/MF $2.25.

Patent application 531,647. Magnetic Heading Reference. Filed Dec. 11, 1974. PC $3.25/MF $2.25.

Patent application 531,648. A Device Responsible to Applied Torque for Grasping an Elongated, Externally Threaded Body as the Body Is Extracted From an Internally Threaded Opening. Filed Dec. 11, 1974. PC $3.25/MF $2.25.

Patent application 533,608. Filtering Device. Filed Dec. 17, 1974. PC $3.25/MF $2.25.

Patent application 534,266. High Temperature Strain Gage Calibration Fixture. Filed Dec. 19, 1974. PC $3.25/MF $2.25.

Patent application 535,410. A Remotely Operable Articulated Manipulator. Filed Dec. 23, 1974. PC $3.25/MF $2.25.

Patent 3,849,865. Method of Protecting the Surface of a Substrate. Patented Nov. 26, 1974. Not available NTIS.

Patent 3,849,877. Method for Making Conductors for Ferrite Memory Arrays. Patented Nov. 26, 1974. Not available NTIS.

Patent 3,850,169. Circuit for Detecting Initial Systole and Dicrotic Notch. Patented Nov. 26, 1974. Not available NTIS.

Patent 3,850,388. Integrated Lift/Drag Controller for Aircraft. Patented Nov. 26, 1974. Not available NTIS.

Patent 3,850,567. Evacuated, Displacement Compression Mold. Patented Nov. 26, 1974. Not available NTIS.

Patent 3,850,754. Automatic Inoculating Apparatus. Patented Nov. 26, 1974. Not available NTIS.

Patent 3,851,238. Phase-Locked Servo System. Patented Nov. 26, 1974. Not available NTIS.

Patent 3,853,003. Wind Tunnel Flow Generation Section. Patented Dec. 10, 1974. Not available NTIS.

Patent 3,853,075. Automatically Operable Self-Leveling Load Table. Patented Dec. 10, 1974. Not available NTIS.

Patent 3,854,097. Self-Energized Plasma Compressor. Patented Dec. 10, 1974. Not available NTIS.

Patent 3,854,113. Variable Resistance Constant Tension and Lubrication Device. Patented Dec. 10, 1974. Not available NTIS.

Patent 3,855,873. Geneva Mechanism. Patented Dec. 24, 1974. Not available NTIS.

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

Assistant General Counsel for Patents,
Washington, D.C. 20545

Patent 3,801,446. Radioisotope Fueled Heat Transfer System. Filed June 5, 1968. Patented Apr. 2, 1974. Not available NTIS.

U.S. DEPARTMENT OF AGRICULTURE

Research Agreements and Patent Mgt. Branch,
General Services Division, Federal Bldg.,
Agricultural Research Service,
Hyattsville, Md. 20782

Patent 3,814,240. Separation of Thermoplastic Film and Wastepaper. Filed Sept. 13, 1972. Patented June 4, 1974. Not available NTIS.

U.S. DEPARTMENT OF THE NAVY

Assistant Chief for Patents, Office of Naval Research, Code 302, Arlington, Va. 22217

Patent 3,757,854. Horizontal Bottom-Freezing Apparatus. Filed June 24, 1971. Patented Sept. 11, 1973. Not available NTIS.

Patent 3,760,293. Continuous Wave, Free-Burning Flame Laser. Filed Feb. 24, 1972. Patented Sept. 18, 1973. Not available NTIS.

Patent 3,760,755. Guidance System for Straight Running Vehicles. Filed Sept. 20, 1971. Patented Sept. 25, 1973. Not available NTIS.

Patent 3,762,352. Large Floating Ocean Platform. Filed Feb. 24, 1972. Patented Oct. 2, 1973. Not available NTIS.

Patent 3,763,463. Shrapnel Sonar. Filed Sept. 21, 1972. Patented Oct. 2, 1973. Not available NTIS.

Patent 3,764,092. Circulation Control Airfoil System. Filed Dec. 7, 1970. Patented Oct. 9, 1973. Not available NTIS.

Patent 3,764,100. Compound-Two-Stage Resilient Isolation Mounting for Use in Attenuating Mechanical Vibrations. Filed Dec. 27, 1971. Patented Oct. 9, 1973. Not available NTIS.

Patent 3,764,217. Pulsed Coherence Length Measurement Device. Filed June 16, 1972. Patented Oct. 9, 1973. Not available NTIS.

Patent 3,764,233. Submersible Motor-Pump Assembly. Filed Nov. 15, 1971. Patented Oct. 9, 1973. Not available NTIS.

Patent 3,764,432. Method of Making an Acoustic Window Including Filling Honeycomb Cells Individually. Filed Mar. 15, 1971. Patented Oct. 9, 1973. Not available NTIS.

Patent 3,764,796. Chemical Lighting Device. Filed Oct. 5, 1972. Patented Oct. 9, 1973. Not available NTIS.

Patent 3,764,924. Synchronous Detection System. Filed May 8, 1972. Patented Oct. 9, 1973. Not available NTIS.

Patent 3,764,966. Underwater Earphone. Filed Mar. 8, 1972. Patented Oct. 9, 1973. Not available NTIS.

Patent 3,765,334. Conductive Igniter Composition. Filed Dec. 20, 1971. Patented Oct. 16, 1973. Not available NTIS.

Patent 3,765,353. Module Connectors. Filed Feb. 2, 1973. Patented Oct. 16, 1973. Not available NTIS.

Patent 3,765,354. Life Support System With a Hull Heat Exchanger. Filed Oct. 24, 1972. Patented Oct. 16, 1973. Not available NTIS.

Patent 3,765,355. Salvage System. Filed Feb. 4, 1972. Patented Oct. 16, 1973. Not available NTIS.

Patent 3,765,624. Fluidically Augmented Variable Gain Artificial Feel System. Filed Sept. 29, 1971. Patented Oct. 16, 1973. Not available NTIS.

PATENT EXAMINING CORPS

WILLIAM FELDMAN, Acting Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF MARCH 29, 1975

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—M. STERMAN, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	5-28-74
GENERAL ORGANIC CHEMISTRY, GROUP 120—R. F. BURNETT, Acting Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	4-15-74
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	3-18-74
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—A. L. LEAVITT, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	6-27-74
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—R. FRIEDMAN, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	5-6-74
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	9-4-74
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	1-9-74
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	4-1-74
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	9-3-74
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	5-3-74
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	1-10-74
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—G. M. FORLENZA, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	7-12-74
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—D. J. STOCKING, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	8-5-74
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—R. E. PULFREY, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	7-31-74
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	6-10-74
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	9-16-74

Expiration of patents: The patents within the range of numbers indicated below expire during April 1975, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,828,487 to 2,832,958, inclusive
Plant Patents..... Numbers 1,694 to 1,697, inclusive

REISSUES

PUBLISHED APRIL 15, 1975

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

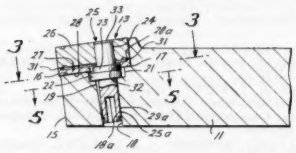
28,389
INDEXABLE BIT CUTTING TOOL HOLDER

Arthur A. Melinder, deceased, late of Houston, Tex., by Betty Gene Melinder, executrix, 10006 Hanka, Houston, Tex. 77055

Original No. 3,672,016, dated June 27, 1972, Ser. No. 16,046, Mar. 3, 1970. Application for reissue July 30, 1973, Ser. No. 383,860, which is a continuation of abandoned application Ser. No. 295,245, Oct. 5, 1972

Int. Cl. B26d *1/00*

U.S. Cl. 29—96 10 Claims



1. An indexable bit cutting tool holder comprising:

(a) an elongated shank;

(b) there being a recess on one end of said shank which defines *a support surface and* a shoulder spaced from [and inclined toward] the adjacent end of said shank [and a support surface inclined from the bottom of said inclined shoulder toward the adjacent end of said shank];

(c) there being a cylindrical bore extending *into* [through] said shank in the recess, said bore being elongated along its longitudinal axis;

(d) said cylindrical bore including a counterbore concentric therewith which intersects said support surface;

(e) pin means having substantially the same diameter as the cylindrical bore and rotatable therein;

(f) a cam surface on said pin means for fitting in the counterbore; and

(g) a cylindrical projection on said pin means engageable with the indexable bit cutting tool *when said cam surfaces engages said counterbore upon rotation of said pin means whereby the* [for linearly moving the] indexable bit cutting tool *is moved* against said [inclined] shoulder *means* and [locking the bit cutting tool] *locked* in the recess [when said pin is rotated in the cylindrical bore].

28,390
AIR DRIVEN DENTAL HANDPIECES

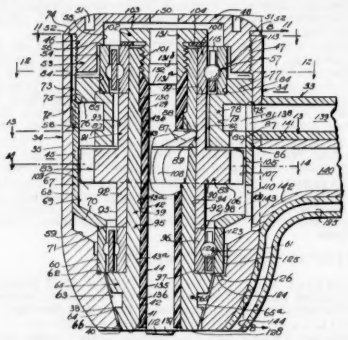
Martin Staunt, Des Plaines, Ill., assignor to American Hospital Supply Corporation, Evanston, Ill.

Original No. 3,255,527, dated June 14, 1966, Ser. No. 217,570, Aug. 17, 1962, which is a continuation-in-part of application Ser. No. 789,751, Jan. 28, 1959, now Patent No. 3,084,439, which is a continuation-in-part of application Ser. No. 620,434, Nov. 5, 1956, now Patent No. 2,988,815. Application for reissue Feb. 2, 1968, Ser. No. 706,202

Int. Cl. A61c *1/12*

U.S. Cl. 32—27 4 Claims

3. An air driven dental handpiece assembly, comprising a tubular shaft, having a cylindrical bore extending through said shaft, said shaft having an external cylindrical body, extending from its upper end to an annular shoulder adjacent its lower end, an integral frusto-conical enlargement at the lower end of said shaft and extending from said annular shoulder to the end of said shaft, said shaft having a threaded bore at its upper end, a rotor comprising a cylindrical enlargement having slots forming blades, having a cylindrical bore fitting on said shaft and having an integral cylindrical tubular extension axially located and carried above and another cylindrical tubular



extension axially located and carried below said cylindrical enlargement, a lower bearing member located on the lower end of said shaft and confined between said annular shoulder and the end of said lower tubular extension of said rotor, an upper bearing member located on the upper end of said shaft and engaging the upper end of said upper extension and an externally threaded bearing retainer threaded into the upper end of said tubular shaft and having a radially extending head with a lower annular surface engaging and confining said upper bearing on said shaft.

28,391
LOADING DOCK SHELTERS

Cyril P. Frommelt and Sylvan J. Frommelt, Dubuque, Iowa, assignors to Dubuque Awning & Tent Company, Dubuque, Iowa

Original No. 3,792,559, dated Feb. 19, 1974, Ser. No. 285,052, Aug. 30, 1972. Application for reissue July 5, 1974, Ser. No. 485,806

Int. Cl. E04f *10/04;* E06b *1/56*

U.S. Cl. 52—173 10 Claims

1. A loading dock shelter comprising

a. a front cover,

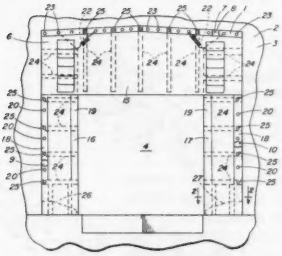
b. means for supporting said cover in position to extend along the top and sides of a doorway in a warehouse wall in outwardly disposed relation to said wall,

c. said cover including *a top panel, and* two flexible side panels mounted on said supporting means in position to extend downwardly from said top panel along respective sides of said doorway and extend horizontally toward each other in position to sealingly engage the

sides of a truck backed into operative position relative to said doorway for loading and unloading of said truck, and

d. means for holding the lower portions of said side panels in outwardly spaced relation to said wall,

e. said last mentioned means comprising two resilient cushion means mounted between said warehouse and



the lower end portion of a respective one of said side panels,

f. each of said cushion means having

(1) an inner edge facing toward the other of said cushion means, and

(2) an upper surface sloping upwardly and outwardly away from said inner edge.

28,392

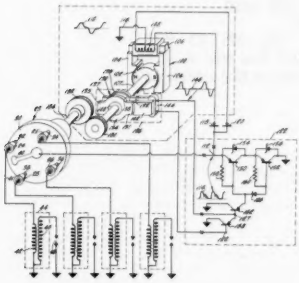
MAGNETO IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES AND THE LIKE

Bobby E. McMillen, Columbus, Miss., assignor to Ambac Industries, Incorporated

Original No. 3,326,199, dated June 20, 1967, Ser. No. 388,360, Aug. 10, 1964. Application for reissue June 18, 1968, Ser. No. 748,575

Int. Cl. F02p *1/00*

U.S. Cl. 123—149 A **19 Claims**



1. An ignition system for an internal combustion engine, comprising:

voltage-operable engine fuel igniting means for igniting combustible fuel in said engine;

distributor means having an input terminal, an output terminal, and an element movable in synchronism with said engine operation for connecting said input terminal intermittently to said output terminal;

an electronically-controllable current-switching circuit having a high conduction state and a low conduction state and actuatable between said states in response to electrical control pulses applied thereto;

means connecting said input and output terminals of said distributor means in common series circuit with said fuel igniting means, and connecting said current-switching circuit in parallel with said series circuit;

means for generating a series of [voltage] pulses in synchronism with operation of said engine, and for applying them across said series circuit; and

means for generating a control pulse signal comprising pulses recurrent in synchronism with said engine operation, and for applying said signal to said current-switching circuit to actuate said current-switching circuit to said high conduction state during an interval of initial build-up of each of said [voltage] pulses of said series to a predetermined level and for actuating said current-switching circuit to said low conduction state during an interval in which each of said [voltage] pulses of said series exceeds said predetermined level.

28,393

DEVICE FOR CHECKING DRIVING BATTERY VOLTAGE IN A MOTION-PICTURE CAMERA WITH A WIDE RANGE OF FRAME SPEED

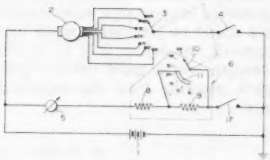
Hiroshi Hirata, Sakai, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Original No. 3,583,800, dated June 8, 1971, Ser. No. 804,069, Mar. 4, 1969. Application for reissue Nov. 2, 1971, Ser. No. 194,958

Claims priority, application Japan, Mar. 8, 1968, 43/18,094; Mar. 27, 1968, 43/24,258

Int. Cl. G03b *17/18*

U.S. Cl. 352—170 **5 Claims**



1. A device for checking voltage of a power source battery in a motion picture camera [drive by a] *having an electric* driving motor *for driving film in the camera at various speeds,* and [capable of] *means to select the speed of operation of said motor to enable* shooting with various frame speeds over a wide range *said devise* comprising,

a galvanometer for indicating whether electric current flowing through it is greater [of] *or* less than a predetermined level;

[an electric driving motor for driving the film in the camera at varying speed; means to select the speed of operation of said motor;]

a resistor assembly connected in series with said galvanometer, *and* means for varying the resistance value of said resistor assembly in response to the selection of a frame speed and corresponding *generally* with the internal impedance of said driving motor while running at the selected frame speed;

said galvanometer and resistor assembly forming a circuit to be connected to the power source battery, said circuit being connected in parallel with the driving motor.

28,394

APPARATUS FOR TESTING ELECTRICAL CONTACT BETWEEN METALLIC OBJECTS

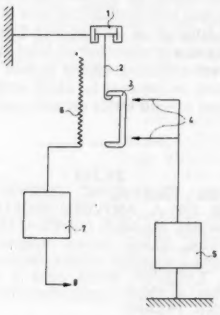
Marcel Point, Grenoble, France, assignor to Air-Industrie, Courbevoie, France

Original No. 3,739,228, dated June 12, 1973, Ser. No. 227,361, Feb. 18, 1972. Application for reissue July 12, 1973, Ser. No. 378,669

Claims priority, application France, May 21, 1971, 7118740

Int. Cl. B05b 5/00

U.S. Cl. 317—3 5 Claims



1. A device for testing the electrical contact between a metallic object and a grounded support on which said object is to be subjected to an electrostatic coating process, said device comprising means for imparting an electrical charge to said object [and means for indicating whether said charge is conducted away from said object through said grounded support or a sufficient charge accumulates on said object to generate a spark between said object and support] *just before it is to be subjected to said coating process, and a spark detector positioned to detect any spark resulting from the imparting of said electrical charge.*

28,395

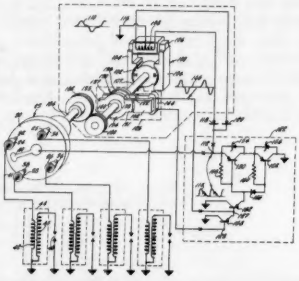
MAGNETO IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES AND THE LIKE

Bobby E. McMillen, Columbus, Miss., assignor to Ambac Industries, Incorporated, Columbus, Miss.

Original No. 3,326,199, dated June 20, 1967, Ser. No. 388,360, Aug. 10, 1964. Application for reissue July 1, 1971, Ser. No. 159,074, which is a division of application Ser. No. 748,575, June 18, 1968

Int. Cl. H02p 9/00

U.S. Cl. 322—91 4 Claims



12. In a magneto ignition system, the combination comprising a stator core, a magneto coil mounted on said stator core, means providing a circuit passing through said magneto coil, a rotor having a permanent magnet for producing a varying flux through said stator core, and an electronic control circuit for opening and closing said circuit through said magneto coil to permit and interrupt the flow of current therethrough, said electronic control circuit including an electronic switch and a control coil mounted on said stator core so that the flux produced by said permanent magnet and which passes through said magneto coil also passes through said control coil throughout at least a portion of each revolution of said rotor to induce a trigger signal therein for triggering said electronic switch device which trigger signal is in phase with the signal induced in said magneto coil.

PLANT PATENTS

GRANTED APRIL 15, 1975

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

3,703
AVOCADO TREE
Stephen R. Nemcik, Buena Park, Calif., assignor of a fractional part interest to Frank Gilkerson
Filed Mar. 12, 1974, Ser. No. 450,480
Int. Cl. A01h *5/03*
U.S. Cl. Plt.—44 **1 Claim**

1. The new variety of avocado tree substantially as shown and described herein, being distinguished for its ability to produce fruit with a seed of unusually small size in relation to fruit size and fruit flesh and to bring this fruit to maturity several weeks earlier than the fruit of comparable fall-maturing avocado varieties in the same growing area; the fruit of this variety also being notable because of its smooth, leathery skin which enhances the resistance of the fruit to damage in shipping and handling; said variety further bearing fruit the interior flesh of which retains its natural color after exposure to air.

3,704
AZALEA PLANT
Takeo Yuge, Altadena, Calif., assignor to Geo. J. Ball, Inc., Chicago, Ill.
Filed Apr. 10, 1974, Ser. No. 459,656
Int. Cl. A01h *5/00*
U.S. Cl. Plt.—56 **1 Claim**

1. A new and distinct variety of azalea plant substantially as herein shown and described, characterized by its vigorous, profusely branched and compact growth habit as a greenhouse pot-forcing azalea, and by its profuse production of bright pink blossoms.

3,705
PEAR TREE
Edward H. Palacky, Farmington, Mich., assignor to Hilltop Orchards & Nurseries, Inc.
Filed Mar. 21, 1974, Ser. No. 453,559
Int. Cl. A01h *5/03*
U.S. Cl. Plt.—36 **1 Claim**

1. A new and distinct variety of pear tree substantially as shown and described.

PATENTS

GRANTED APRIL 15, 1975

ERRATA

For CLASS	See PATENT NO.
064-029	3,877,259
073-136	3,877,274
179-100	3,877,363
111-007	3,877,401
128-025	3,877,421
128-057	3,877,422
128-083.5	3,877,423
128-092	3,877,424
128-142	3,877,425
128-165	3,877,426
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128-214.4	3,877,429
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128-283	3,877,431
128-287	3,877,432
128-303	3,877,433
128-327	3,877,434
128-334	3,877,435
128-348	3,877,436
128-373	3,877,437
128-419	3,877,438
128-547	3,877,439
403-202	3,877,523
356-124	3,877,788
427-262	3,877,958
427-172	3,877,959
264-015	3,877,960
427-191	3,877,961
427-375	3,877,962
096-1 LY	3,877,963
428-195	3,877,964
427-304	3,877,965
428-379	3,877,966
428-314	3,877,967
162-176	3,877,968
428-216	3,877,969
427-379	3,877,970
427-053	3,877,971
427-384	3,877,972
264-044	3,877,973
428-290	3,877,974
427-345	3,877,975

PATENTS

GRANTED APRIL 15, 1975

ERRATA—CONTINUED

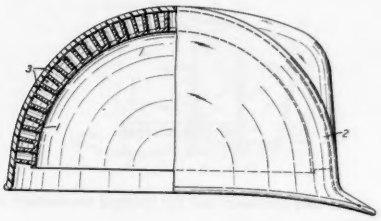
For CLASS	See PATENT NO.
427-317	3,877,976
428-336	3,877,977
210-023	3,877,978
427-337	3,877,979
357-007	3,877,980
427-305	3,877,981
427-087	3,877,982
428-045	3,878,030
428-365	3,878,031
428-101	3,878,032
428-036	3,878,033
428-035	3,878,034
260-835	3,878,035
428-424	3,878,036
252-186	3,878,098
250-211	3,878,105
210-500	3,878,109
352-029	3,878,114
423-263	3,878,214
357-067	3,878,442
250-336	3,878,496
240-10 L	3,878,503
240-025	3,878,505
346-082	3,878,516
346-075	3,878,517
346-015	3,878,518
346-1	3,878,519
340-366	3,878,531
340-347 AD	3,878,532
340-347 AD	3,878,533
340-347	3,878,534
340-347	3,878,535
340-324	3,878,536
340-324	3,878,537
340-282	3,878,538
340-274	3,878,539
340-259	3,878,540
340-244	3,878,541
340-174	3,878,542
340-174	3,878,543

PATENTS

GRANTED APRIL 15, 1975

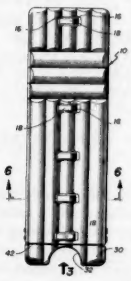
GENERAL AND MECHANICAL

3,877,076
SAFETY HAT ENERGY ABSORBING LINER
James J. Summers, Bethel Park, and Harry W. Austin, Monroeville, both of Pa., assignors to Mine Safety Appliances Company, Pittsburgh, Pa.
Filed May 8, 1974, Ser. No. 468,013
Int. Cl. A42b *1/08*
U.S. Cl. 2—3 R **8 Claims**



1. An energy absorbing liner for a safety hat, comprising a curved shell and a plurality of laterally spaced stiff permanently deformable hollow shock absorbing members having inner and outer ends, said members being integrally connected at one end to said shell and substantially perpendicular thereto, and the liner being of a shape to fit inside a safety hat with said shock absorbing members substantially perpendicular to the overlying wall of the hat.

3,877,077
GOALTENDER'S PROTECTIVE PLASTIC PADS
Romeo Chapdelaine, Leominster, Mass., assignor to Mylec, Inc., Winchendon Springs, Mass.
Filed Nov. 23, 1973, Ser. No. 418,610
Int. Cl. A41d *13/06*
U.S. Cl. 2—22 **2 Claims**



1. Protective padding comprising a relatively thin elongated plastic molded front face, a foamed cellular plastic rear member, said rear member being of substantial thickness, means temporarily securing said members together, an elongated recess in the foam member facing away from the front face, a separate foot and ankle member located at one end of the rectangular face, and means securing the foot and ankle member to the front face, the foot and ankle member being in prolongation of the front face, and the foam padding member extending the entire length of both the front face and the foot and ankle member,

the means for securing the front face to the padding member comprising a strap, said front face having a pair of spaced apertures therein receiving the strap, the strap extending to the rear about the padding member.

3,877,078
VERSATILE TWO-PIECE BODY GARMENT
Karen Tepper, 2828 Kings Hwy., Brooklyn, N.Y. 11229
Filed Dec. 12, 1973, Ser. No. 423,909
Int. Cl. A41d *1/22, 1/06, 1/14*
U.S. Cl. 2—74 **1 Claim**

1. An outer garment worn primarily over the wearer's torso comprising first and second independent and complementary garment pieces either of which is capable of being wrapped around the other;

said first and second pieces respectively covering left and right-hand portions of the body;

each of said garment pieces having separable fastening means for individually securing each of the body pieces around the wearer's waist independently of the other body piece;

one of the garment pieces being substantially completely wrapped about the other garment piece only in the region of the wearer's waist and tapering away from the other garment piece both above and below the waist;

each of said garment pieces being further comprised of a bodice portion for covering one side of the wearer's torso; said bodice portions each having additional tie means positioned behind the wearer's neck for releasably securing the bodice portions to one another.

3,877,079
METHOD FOR MAKING AN ARTICLE CONFORMABLE TO A VARIABLY SHAPED CYLINDRICAL SURFACE
Mary Louetta O'Bryant, 304 Fontana Pl., N.E., Albuquerque, N. Mex. 87108
Filed Dec. 10, 1973, Ser. No. 423,069
Int. Cl. A41h *3/00*
U.S. Cl. 2—243 B **9 Claims**

1. A method of making elements for forming a cylindrical portion of an article of clothing, from elements of planar material comprising essentially diamond-shaped component parts, the method comprising the steps of:

conforming a flexible sheet of a first material to the desired cylindrical shape;

constructing intersecting groups of quasi-parallel diagonals on the first material to form essentially diamond-shaped segments thereon;

labelling the segments to establish their juxta-positional relationship to one another on the surface; and

cutting a second planar material to provide elements comprising diamond-shaped component parts, every one of

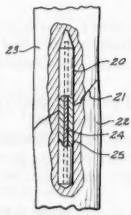
the component parts corresponding to a different one of the segments of the first material.

3,877,080

ACICULAR SILICON CARBIDE DISPERSION IN PYROLYTIC GRAPHITE MATRIX FOR USE IN BIOMEDICAL IMPLANTS

Eugene L. Olcott, Falls Church, Va., assignor to Atlantic Research Corporation, Alexandria, Va.

Filed Oct. 30, 1972, Ser. No. 301,778
Int. Cl. A61f *1/24, 1/22*
U.S. Cl. 3—1 **11 Claims**



1. A biomedical implant composed of a composite of pyrolytic graphite and silicon carbide in which said pyrolytic graphite comprises layers of crystallites of pyrolytic graphite and said silicon carbide comprises codeposited crystalline aciculae embedded in said crystallites, said aciculae being oriented so that the longitudinal axes of the aciculae are substantially aligned with the c-direction of said crystallites.

3,877,081

WATER SAVING DEVICE FOR WATER CLOSET

Walter A. Klein, 5200 Mt. Vernon Hwy., Alexandria, Va. 22309

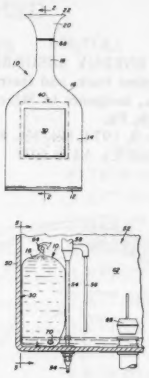
Filed May 31, 1972, Ser. No. 258,416
Int. Cl. A47k *17/00*
U.S. Cl. 4—1 **13 Claims**

1. Apparatus for reducing the volume of water discharged by the flush tank of a water closet during a flushing operation, comprising:

a flexible, collapsible, watertight, lightweight bag-like container having a side wall and a closed bottom;

means including a closable top for permanently filling said container with a quantity of liquid equal to the quantity by which said volume of discharged water is to be reduced; and

adhesive securing means for positioning said container within and below the normal water level of said flush tank to displace said quantity of water, thereby reducing the volume of water discharged during a flushing operation, and for securing said container to prevent contact be-



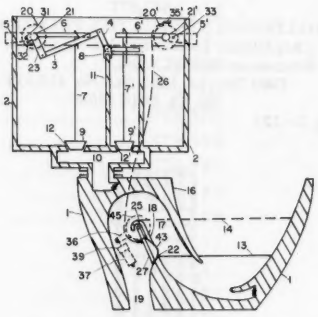
tween said container and the flushing mechanism of said tank.

3,877,082

WATER CLOSETS

John Raymond Wilhelm, 11605 Split Rail Ct., Rockville, Md. 20852

Filed Apr. 9, 1974, Ser. No. 459,363
Int. Cl. E03d *1/22, 1/30*
U.S. Cl. 4—67 R **2 Claims**



1. In a water closet of the variable-quantity type having a first tank of standard volume and a second tank of relatively smaller volume with respective flushing devices for emptying such tanks into a common bowl and a water trap formed by a bowl rear wall and a trap wall spaced rearwardly therefrom, a liquid-level control apparatus, comprising

a valve opening in said trap wall intermediate the length thereof and interconnecting such water trap and a sewer access opening,

a valve member adapted to cooperate with said valve opening and mounted for movement into and out of contact with said valve opening,

means urging said valve member to a normally closed position in contact with said valve opening, and

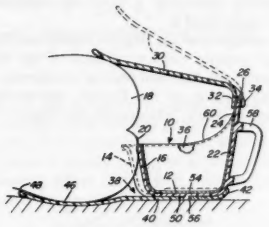
means interconnecting said valve member and the flushing device of such second tank for moving said valve member to an open position upon operation of such flushing device,

whereby the liquid level in such bowl is selectively controlled by the operation of the flushing device of such second tank.

3,877,083
BEDPAN

Hugo E. Howe, 625 Saint Joseph Ave., Long Beach, Calif. 90814

Filed June 11, 1973, Ser. No. 368,472
Int. Cl. A61g *9/00*
U.S. Cl. 4—112 **10 Claims**

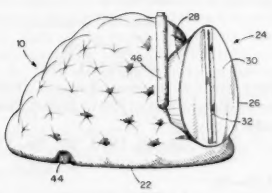


1. For defecation use by a bed patient, an open top side-type bedpan embodying a horizontal bottom wall marginally encompassed by an integral upstanding riim, said rim embodying a proximal patient contacting front wall, a distal rear wall and complemental end walls structurally and functionally uniting said bottom, front and rear walls, an adapter for said bedpan designed and adapted to be interposed between a bed mattress and the underneath side of said bottom wall, said adapter having (1) a base portion at a rearward end atop which the bottom wall of said bedpan is supportively and fully seated when the bedpan is being used, and (2) a lower buttocks seating and pan retaining flap at the forward end of said adapter.

3,877,084
INFLATABLE SAUNA

Timothy E. Johnson, 47 Terrace Ave., Newton Highlands, Mass. 02161, and Thomas K. Norton, 268 River St., Apt. 5, Cambridge, Mass. 02139

Filed June 28, 1973, Ser. No. 374,809
Int. Cl. A61h *33/06*
U.S. Cl. 4—160 **12 Claims**



1. An inflatable sauna comprising:

(a) a hollow, free-standing collapsible structure having an exterior wall, and having an interior wall fastened face to face to said exterior wall solely at spaced locations to form a single interconnected inflation chamber therebetween;

(b) an air valve mounted on one of said walls and communicating with said inflation chamber for use in inflating and deflating said chamber;

(c) a partition disposed vertically within said structure and being affxied to said interior wall to divide the interior of said structure into a sauna room and a warming room, said paritition including closable passage means for permitting occupants to pass between said rooms;

(d) door means mounted in said structure to provide a closable entrance and exit to and from said warming room;

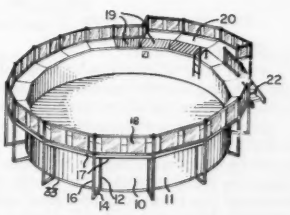
(e) a heating unit mounted within said structure for heating the air within said sauna room to at least 170°; and

(f) an exhaust conduit having its inlet end positioned in communication with said heating unit within the interior of said structure at a height nearer to the lowermost portion than to the uppermost portion of said structure, and having its outlet end positioned outside of said structure whereby heating unit exhaust gases and cool moist air are continuously exhausted from said structure.

3,877,085
ABOVE-GROUND MODULAR SWIMMING POOL ENCLOSURES

Finley M. Bukaitz, Clifton, N.J., and George Neuser, Spring Valley, N.Y., assignors to Delta Industries, Inc., Carlstadt, N.J.

Filed Apr. 8, 1974, Ser. No. 458,571
Int. Cl. E04h *3/16*
U.S. Cl. 4—172.19 **10 Claims**



1. In an above-ground swimming pool of the type including a plurality of horizontal base members extending outwardly from and supporting a pool enclosure, a plurality of inner vertical posts each secured to one of said base members closest to said enclosure to support said enclosure thereat and a plurality of outer vertical posts of a length greater than said inner vertical posts, the combination therewith of an integral deck and fence assembly comprising,

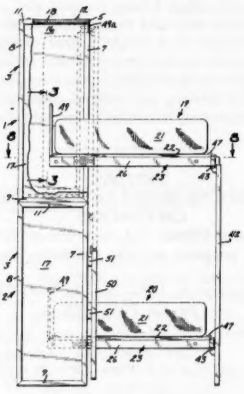
a. a given number of deck assemblies each comprising a plurality of interlocking slats secured within a first channel of a length determined by the distance between two inner vertical posts, and a second channel of a length determined by the distance between two outer vertical posts,

b. means for securing said deck assemblies about the periphery of said enclosure and positioned between the respective inner and outer vertical posts to provide a walk-way about said enclosure,

c. a given number of fence assemblies each comprising at least two panels secured between an upper fence channel and a lower fence channel, and

d. clip means coupled at each end of said lower and upper channels and adapted to coact with the upper end of said outer vertical post at said upper fence channel and a lower end of said outer vertical post at said lower fence channel to clip and secure said given number of fence assemblies each respectively between two of said outer vertical posts to form a relatively vibration free assembly for said pool enclosure.

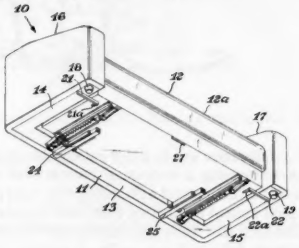
3,877,086
WALL BED
Richard C. Bue, Chaska, and Neil M. Beltt, Minneapolis, both of Minn., assignors to Sico Incorporated, Edina, Minn.
Filed Jan. 28, 1974, Ser. No. 436,860
Int. Cl. A47c *13/18*
U.S. Cl. 5—9 R **12 Claims**



1. A wall bed comprising:
a. a vertical generally rectangular supporting frame structure including laterally spaced end frames and generally horizontal frame members connecting the end frames;
b. a bed including a rectangular bed frame structure for supporting a mattress thereon;
c. mounting means mounting the bed frame structure in the supporting frame structure for pivotal movments on a horizontal axis between a horizontal operative position projecting forwardly of the supporting frame structure and a generally vertically disposed storage position between said end frame members, said mounting means comprising a pair of axially aligned stub shafts on one of said structures and a pair of aligned bearings on the other of said structures and each having pivotal engagement with a different one of said stub shafts;
d. and means yieldingly urging the bed frame structure in a direction of pivotal movement toward said storage position thereof and comprising:
1. an elongated generally straight torsion bar disposed on the axis of pivotal movement of the bed frame structure;
2. means rigidly connecting one end of said torsion bar to said supporting frame structure to anchor said one end against rotation relative to the supporting frame structure;
3. and anchoring means rigidly connecting a portion of said torsion bar longitudinally spaced from said one end thereof to said bed frame against rotation of said torsion bar portion relative to said bed frame structure.

3,877,087
CONVERTIBLE COUCH AND MECHANISM THEREFOR
M. Fillmore Harty, Bloomfield Hills, Mich., assignor to The Dow Chemical Company, Midland, Mich.
Filed May 9, 1974, Ser. No. 468,303
Int. Cl. A47c *17/14*
U.S. Cl. 5—13 **19 Claims**

1. A sofa bed, the sofa bed comprising
a frame, the frame having affixed thereto
a positioning mechanism, the positioning mechanism carrying
a seating portion, the seating portion comprising at least
a first slab-like cushioning member and
a second slab-like cushioning member disposed adjacent thereto, and selectively positionable in face to face or edge to edge relationship, the first and second cushioning members each having major faces in generally opposed spaced apart relationship when the cushioning members are in face to face relationship,
a flexible cushioning layer interposed between said major surfaces, the flexible cushioning layer having
an affixed major surface and
an opposed major surface, the flexible cushioning layer comprising generally a layer of cushioning material folded upon itself at
a folded portion and the flexible cushioning layer affixed to at least a major portion of each of the adjacent major surfaces of the first and second cushioning slabs,
the folded portion of the flexible cushioning layer beng disposed generally adjacent to the frame,

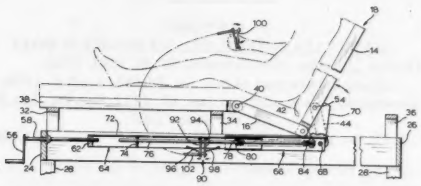


the flexible layer being generally unconnected to the first and second cushioning members in the region of the fold of the flexible layer,
when the cushioning members are in edge to edge relationship the flexible cushioning layers having a generally planar configuration and being spaced from the positioning mechanism by the cushioning members,
the positioning mechanism capable of positioning the first cushioning member remotely from the frame, and
the second cushioning member being pivotable about the flexible cushioning layer generally about **180°** to a position adjacent to the frame and between the frame and the first cushioning layer to thereby provide a generally planar sleeping surface and
the support mechanism on extension raising the first slab to a higher position when remote from the frame then when adjacent to the frame.

3,877,088
HOSPITAL BED
Wim John Michael Bouman, Toronto, Ontario, Canada, assignor to Metal Craft (1970) Limited, Beamsville, Ontario, Canada
Filed June 18, 1973, Ser. No. 370,774
Int. Cl. A61g *7/06*
U.S. Cl. 5—66 **5 Claims**

4. In a hospital bed of the type having a bed frame, a mattress supported above the frame and coupled to the bed frame, and a head gatch mechanism coupled to the bed frame and to a head section of the mattress support for moving the head section between a horizontal position and an inclined position, the improvement in which the head gatch mechanism comprises: first and second elements telescopically interconnected for axial movement relative to one another; spring means coupled at its ends to said first and second elements, said spring means. biasing the elements away from one another; means coupling the second element to the head section; a double acting locking mechanism coupled to the first and second elements and adapted to prevent movement between

the first and second elements when a substantial force is applied to move one of said elements; and actuactor means coupled to the first element and to the bed frame and adapted to move the first element axially relative to the bed frame, whereby when the bed is in use, the head gatch mechanism



can be adjusted to the weight of a patient on the bed by first releasing the locking mechanism to permit relative movement between the first and second elements, and then by moving the said first element axially using the actuactor means so as to vary the biassing effect of the spring means until the said effect is balanced by the weight of the patient.

3,877,089

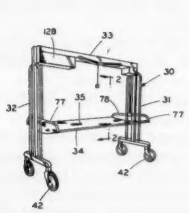
INVALID LIFT APPARATUS

Joseph Wesley Spivey, Lake Wales; David W. Peters, and Joseph F. Nemechik, both of Mulberry, all of Fla., assignors to Mercy-Lift, Inc., Lake Wales, Fla.

Filed May 7, 1973, Ser. No. 357,681

Int. Cl. A47c *3/32;* **A61g** *1/02*

U.S. Cl. 5—81 R **8 Claims**



1. An invalid lifting apparatus comprising a frame having a head end and a foot end, the frame including head support means and foot support means and connecting means extending between the upper end of the head and foot support means, first power lift means mounted on the connecting means adjacent the head end of the frame and second power lift means mounted on the connecting means adjacent the foot end of the frame, each of the power lift means including a generally vertically extending telescoping lift tube extending downwardly therefrom, a generally rectangular sheet frame attached to the telescoping lift tubes of the first and second power lift means, and a sheet attached to the sheet frame for supporting an invalid, each power lift means being operable to telescopingly extend or retract the associated lift tube to lower or raise the sheet frame.

3,877,090

CRIB BUMPER AND MATTRESS

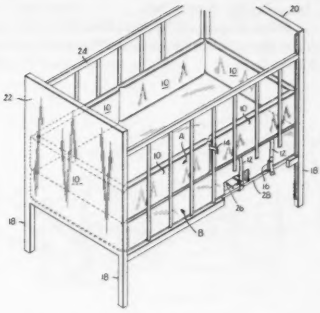
Bernard R. Schutz, New York, N.Y., assignor to Fine Art Pillow and Spec. Corporation, New York, N.Y.

Filed Apr. 12, 1974, Ser. No. 460,443

Int. Cl. A47c *27/08*

U.S. Cl. 5—93 R **4 Claims**

1. A bumper for use in an infant crib or the like of the type having a frame with a horizontal frame member and side rails extending up from said horizontal member, said bumper comprising at least one upstanding section adapted to rest inside the side rail adjacent thereto, and means depending from said upstanding section and engageable with said horizontal frame member for connecting said upstanding section to said hori-



zontal frame member in vertical-movement-preventing fashion.

3,877,091

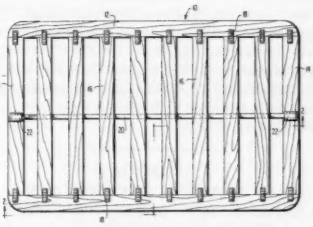
BED FRAME CONSTRUCTION

John Calvin Jureit, Coral Gables, and Andrew G. Seipos, Miami, both of Fla., assignors to Automated Building Components, Inc., Miami, Fla.

Filed Aug. 28, 1973, Ser. No. 392,224

Int. Cl. A47c *19/00*

U.S. Cl. 5—200 R **29 Claims**



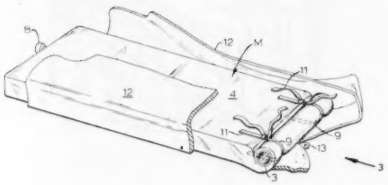
1. A bed frame comprising a pair of elongated wooden members for forming the substantially rigid side members of the frame, a pair of wooden end members disposed between said side members adjacent respective opposite ends thereof, a plurality of longitudinally spaced wooden members extending transversely between said side frame members intermediate said end members, said end, side, and intermediate members lying in substantial coplanar relation each with the other with the opposite ends of the intermediate and end members in substantial butting relation with the inner edges of the side rails respectively, each of said end, side and intermediate members having a width greater than its depth with the wide sides of said members lying in planes generally parallel to the plane containing said bed frame, and means for joining the opposite ends of said end and intermediate members to the respective side frame members including a plurality of sheet metal planes, each of said plates having a plurality of elongated nail-like teeth formed to project to one side of said plate, said plates being applied to at least one side of the respective joints formed between said side members and said end members and between said side members and said intermediate members with the plates spanning said joints and the teeth thereof embedded into the wooden members forming the respective joints, said plates constituting the sole means of connection between the joint members on said one side of the joint.

3,877,092

SELF INFLATABLE AIR MATTRESS, AND SLEEPING BAG WITH AIR PRESSURE CONTROL

Conrad J. Gaiser, Zephyr Cove, Nev., assignor to Gaiser Enterprises, Inc., Zephyr Cove, Nev.

Filed May 2, 1974, Ser. No. 466,124
Int. Cl. A47g *9/00*; **A47c** *23/00*
U.S. Cl. 5—343 **8 Claims**



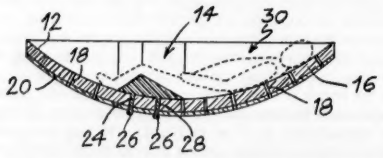
1. A self inflatable air mattress comprising a core of flexible and resilient cellular material of the open cell type allowing free passage of air therethrough, a substantially air tight flexible jacket enclosing said core, a tube communicating with the interior of said jacket from exteriorally thereof for flow of air into and from the cells of said core, and an openable and reclosable closure for said tube which in its closed condition with the cells filled with air prevents escape of air from said cells and maintains them filled with air to provide a resilient air cushion, and which when open and the mattress placed under compression allows escape of air from said cells and flattening of said mattress, said mattress having a mandrel about which it can be wound into a roll to compress the same and thus expel air from said tube and flatten the mattress when said closure is open, said mandrel when rolled with said tube closure closed expelling air from the core cells adjacent said mandrel while increasing pressure in the remaining cells above atmospheric pressure, and detachable connecting members on said mattress jacket to hold said mandrel in a substantially fixed adjusted position to maintain increased pressure with said tube closure closed.

3,877,093

MODULAR REST SURFACE

George Gershbein, 30 W. 69th St., New York, N.Y. 10023

Filed Dec. 13, 1973, Ser. No. 424,465
Int. Cl. A47c *27/00*
U.S. Cl. 5—357 **12 Claims**



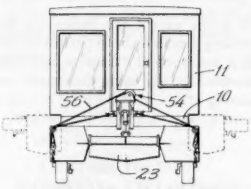
1. A rest surface comprising a base support member having a predetermined surface contour; at least one three-dimensional section having a base surface which conforms to said predetermined surface contour and which projects above said base surface an amount comparable to the linear dimensions of the latter, said at least one section being mountable on any portion of said predetermined surface contour on said base support member and having an upper surface contour which modifies said predetermined surface contour when said at least one section is mounted on said base support member; and connecting means for removably and interchangably connecting said at least one section to any portion of said predetermined surface contour of said base support member for fixing the former to the latter, whereby a rest surface having a desired upper surface contour can be formed and modified at will by selectively positioning said at least one section on any portion of said predetermined surface contour of said base support member and fixing the position thereof on the latter.

3,877,094

COMBINATION TRAILER AND PONTOON BOAT

Thomas J. Kelley, 1017 Fairmont St., St. Paul, Minn.

Continuation-in-part of Ser. No. 25,462, April 3, 1970, abandoned. This application Jan. 10, 1972, Ser. No. 216,595
Int. Cl. B63c *13/00*
U.S. Cl. 9—1 T **8 Claims**



1. A combination trailer and pontoon boat including:
an elongated generally rectangular frame having substantially vertical peripheral walls on opposite sides thereof,
a member on the upper surface of said frame and secured thereto as a part thereof extending laterally beyond said vertical walls,
said vertical walls of said frame and the laterally projecting sides of said member forming notches of substantially rectangular vertical section,
said frame having substantially flat horizontal bottom surfaces adjoining said notches,
a pair of elongated pontoons having substantially flat top panels, substantially parallel side panels in substantially right angular relation to said top panel, and bottom panels connecting the lower edges of said side panels,
longitudinal hinge means connecting one side wall of each pontoon to a side edge of said frame, the axis of each said hinge means being adjacent to the juncture between one of said vertical walls of frame and the bottom surface of said frame,
each said hinge means being connected to said one side wall of a corresponding pontoon at a distance from the top panel thereof substantially equal to the height of said vertical walls thereby in one extreme position of the pontoon a portion of the top panel engages the laterally projecting portion of said member at the top of the corresponding notch,
each said pontoon, when pivoted to its other extreme position, underlying, and bearing against, the flat bottom portion of said frame,
a wheel secured to each said pontoon to project from the other side wall thereof on a substantially vertical pivot when said pontoons are engaged in said notches and on a substantially horizontal axis when said one side walls thereof are in engagement with the flat bottom portions of said frame.

3,877,095

EXPANDABLE BOAT

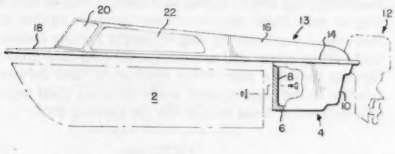
Jessie T. Ivy, Rt. 1, Box 350, Anacortes, Wash. 98221

Filed Nov. 12, 1973, Ser. No. 414,805
Int. Cl. B63b *3/08*
U.S. Cl. 9—6 **7 Claims**

1. An attachment for extending the size and load-carrying

capacity of a boat having a substantially flat transom and a reinforcing means at the gunwale comprising:

a generally hollow extension element including a bottom a forward wall, a rear wall and a pair of interconnecting sides forming an upwardly opening main body which generally continues the lines of the hull of the boat,



means detachably securing the extension element with said forward wall contiguous with the transom of the boat, and a forwardly extending portion integral with the extension element including a deck portion and side rails along the gunwale of the boat, said rails mechanically interlocking with the gunwales.

3,877,096

INFLATABLE PERSONNEL SAFETY MARKER

George A. Scesney, 3825 Scott St., No. 103, San Francisco, Calif. 94123

Filed May 2, 1974, Ser. No. 466,362
Int. Cl. B63c *9/16*
U.S. Cl. 9—14 **11 Claims**

1. An inflatable safety marker adapted to provide a large target for locating persons in distress, said marker comprising a long narrow air-tight tube closed at one end and having valve means at the other end for inflation of the tube, said tube being divided into a plurality of segments and folded at the intersections between the respective segments so that the tube when inflated forms a preselected polyhedron, at least one of the segments being attached in parallel to one of the other segments and the opposite ends of the tube being attached to folded intersections between segments to maintain the inflated tube in the preselected polyhedral configuration.

3,877,097

WATER SKI TRAINING APPARATUS

Don C. Gentry, 1810 Southwest Blvd., Jefferson City, Mo. 65101

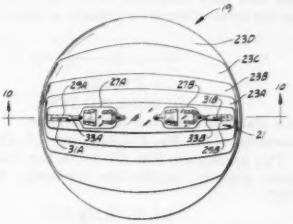
Filed Oct. 5, 1973, Ser. No. 403,926
Int. Cl. A63c *15/00*
U.S. Cl. 9—310 G **10 Claims**

1. Water ski training apparatus comprising a relatively wide ski board adapted to support a skier so that the skier may be pulled by a towboat in water ski fashion, said ski board comprising:

a central ski;

a plurality of sections removably secured to said central ski so as to form a dish-shaped ski board generally of the length of and substantially wider than said central ski; and means for releasably securing said sections to one another and to said central ski, said sections being progressively removable from one another and from said central ski to constitute a series of water ski boards of progressively decreasing width as each said section is removed until only the central ski remains thereby allowing the novice skier to make a relatively gradual transition from skiing on said relatively wide ski board to skiing on said relatively narrow central ski as the skier acquires skill and gains confidence.

10. Water ski apparatus comprising an elongate ski member having binding means for releasably holding at least one of the skier's feet in position on said ski, a front slot adjacent the



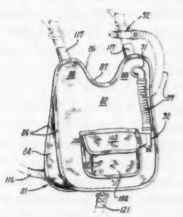
forward end of the ski, a rear slot adjacent the rear end of the ski, said slots extending substantially along the longitudinal axis of the ski, a pair of fins including a front fin mounted on the ski adjacent said front slot, a rear fin mounted on the ski adjacent said rear slot, and means interconnected between said binding means and said fins for selectively moving either of said fins independently of the other between a raised and a lowered position, said means being operable by the skier's feet while skiing.

3,877,098

BUOYANCY COMPENSATOR

Edmund A. Braly, 514 S. Bayshore Blvd., Pacifica, Calif. 94402

Filed May 22, 1973, Ser. No. 354,312. The portion of the term of this patent subsequent to July 24, 1990, has been disclaimed.
Int. Cl. B63c *11/18*
U.S. Cl. 9—313 **3 Claims**



1. An improved buoyancy pillow for a free diver and of the type characterized as including an inflatable bladder adapted to be secured exclusively against the ventral side of the torso of the diver's body and sized to be positioned entirely within the zone between the shoulders and crotch, comprising front and rear panels for said inflatable bladder formed from rubberized fabric material, means interconnecting said panels in an air and watertight manner, the upper portion of said front and rear panels being joined together along a contour which is centrally, inwardly recessed defining a clearance space for the diver's neck and chin and establishing spaced apart shoulder protrusions adapted to lay along the diver's shoulders, a flexible inflation hose connected at one end to said front panel at one of said shoulder protrusions, the other end of said hose terminating in a mouthpiece assembly including manually actuable valve means serving to permit the entry and exhaust of air with respect to said bladder, pressure release valve

means mounted in the sidewall of said bladder and being responsive to a positive pressure differential between the internal and external pressures on said bladder for automatically permitting air discharge from said bladder at a pre-established pressure differential, said means interconnecting said front and rear panels being formed so that in longitudinal cross section said bladder tapers from a narrow section at the top to a wide cross section at the bottom providing said bladder with a center of buoyancy located in the lower one-third portion, and strap assembly means secured to said bladder against the torso of the diver entirely within the above defined zone.

3,877,099

DEBURRING TOOL

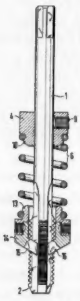
William Halpern, Haviland Rd., Harrison, N.Y.

Continuation of Ser. No. 291,924, Sept. 25, 1972, abandoned. This application Feb. 19, 1974, Ser. No. 443,188

Claims priority, application Germany, Nov. 20, 1971, 2157587

Int. Cl. B23g *5/20*

U.S. Cl. 10—140 **1 Claim**



1. A deburring device comprising, in combination, a tapping tool having a shank, a threaded cutting portion and axially extending chip grooves in said threaded cutting portion, and a deburring device mounted on said tapping tool, said deburring device including a securing ring adjustably secured to the shank of the tapping tool; a spiral compression spring surrounding said tapping tool and having first and second opposite end portions; said first end portion of said spring being operatively connected to said securing ring; said securing ring having an arcuately-extending groove into which at least the first turn of said first end portion of said spring is nested; and, an annular deburring head positioned substantially coaxially with said securing ring and coaxial with and slidable along said threaded cutting portion of the tapping tool; said deburring head comprising: a generally cylindrical mounting ring having first and second ends and a central bore formed therein including a first bore portion at said first end which is slightly larger than the maximum diameter of said cutting portion of the tapping tool, and a second bore portion at said second end and being of larger diameter than said first bore portion; said mounting ring having an annular groove formed at said first end on the periphery thereof in which said second end portion of said compression spring is nested whereby said spring provides a resilient mounting for said deburring head thereby to provide axial movement of said deburring head along said tapping tool; a cutting ring having generally radially extending cutting edges and an axially extending annular collar coaxial with and positioned within said second bore portion of said mounting ring; said annular collar having a peripheral annular groove formed therein located within said second bore portion of said mounting ring; and at least one radially directed set screw extending through the side wall of said second end portion of said mounting ring for engagement with said groove in said annular collar of said cutting ring; said set screw having an inner end portion whose configuration is substantially complementary to the cross section configuration of said groove in said annular collar thereby to locate said cutting ring in a predetermined fixed axial position with respect to said mounting ring and to clamp said cutting ring to said mounting ring in said fixed predetermined position against rotational movement; said cutting ring including cutting means forming said cutting edges and extending into said chip grooves of the tapping tool and preventing rotation of said deburring head relative to the tapping tool, while allowing axial movement of said deburring head relative to the tapping tool.

3,877,100

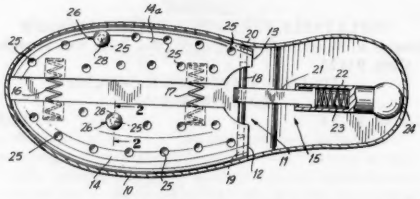
ADJUSTABLE SHOE TREE

Earl William Harvey, Weston, Ontario, Canada, assignor to Lawrence Peska Associates, Inc., New York, N.Y.

Filed Oct. 26, 1973, Ser. No. 398,679

Int. Cl. A43d *5/00*

U.S. Cl. 12—115.2 **4 Claims**



1. A shoe tree comprising a body portion including a front section shaped to fit the toe portion of said shoe, adjustable means for varying the width and length of said body to accommodate various size shoes, said top surface including a plurality of cavities having a circular cross-section distributed thereon, and further comprising at least one stud member adapted to fit into and project from said cavities, said stud member comprising a rod portion having a diameter slightly greater than the said cavity associated therewith and being of a resilient plastic material.

3,877,101

THERMOPLASTIC RUBBER FOOTWEAR

A. Beverley Lewis, Auburn, Maine, assignor to Bonan Footwear Company, Inc., Auburn, Maine

Filed July 22, 1974, Ser. No. 490,254

Int. Cl. A43d *9/00*

U.S. Cl. 12—142 RS **12 Claims**

1. The process of making a shoe having a thermoplastic rubber component, comprising forming small particles of thermoplastic rubber in a manner whereby the said thermoplastic rubber is not substantially thermally degraded, dry blending said small particles with a composition comprising a plasticizer for said thermoplastic rubber to produce a thermoplastic rubber material, and forming the thermoplastic rubber material into the shape of said shoe component.

3,877,102

SAFETY LEG SUPPORT FOR A DOCKBOARD

Thomas G. Artzberger, Menomonee Falls, Wis., assignor to Kelley Company, Inc., Milwaukee, Wis.

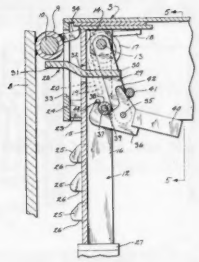
Filed May 20, 1974, Ser. No. 471,664

Int. Cl. B65g *11/00*

U.S. Cl. 14—71 **14 Claims**

1. In a dockboard, a supporting structure, a ramp structure hinged at its rear edge to the supporting structure and movable from a generally horizontal position to an upwardly inclined position, a fixed support connected to one of said structures, a movable support secured to the other of said structures and movable between an operable ramp-supporting

position and an inoperable position, biasing means to bias the movable support to the operable position, means for moving the movable support to the inoperable position, latch means for retaining the movable support in the inoperable position,



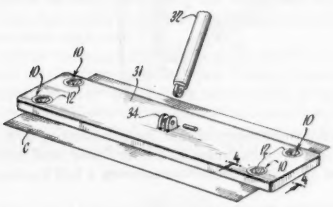
and means responsive to a predetermined rapid downward acceleration of the ramp structure caused by descent of the ramp structure with an added load thereon for releasing said latch means whereby the movable support will be moved to the supporting position by said biasing means.

3,877,103

CLOTH HOLDERS AND CLEANING IMPLEMENTS UTILIZING THE SAME

Lawrence M. Nash, East Brunswick, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed July 23, 1973, Ser. No. 381,970
Int. Cl. A47l *13/256, 13/46*
U.S. Cl. 15—147 R **9 Claims**



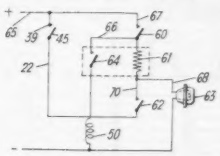
1. A holder for cloth or other articles comprising a substantially cylindrical hollow member of resilient material having an open end and a substantially closed end, said closed end having a plurality of radial slits therein forming a plurality of triangular fingers extending inwardly in slanting fashion in a converging pyramidal shape with the apexes of said triangular fingers approaching each other at the apex of said pyramidal shape in angular fashion and with said triangular fingers forming the inwardly slanting faces of said pyramidal shape, the angle of the apex of the pyramid formed by the approaching triangular fingers being between 60° and 140°, said triangular fingers being substantially in contact along the major portions of their lengths with adjacent fingers and within 0.030 inch from each other and capable of yielding resiliently to permit forcible entry of a cloth or other article therebetween and returning in the direction of their original contacting configuration upon removal of said force whereby the cloth or other article is gripped and held by the pinching action of said triangular fingers.

3,877,104

VEHICLE HEADLAMPS

Frederick Raymond Patrick Martin, Bromley, England, assignor to The Lucas Electrical Company Limited, Birmingham, England

Filed Jan. 5, 1973, Ser. No. 321,308
Claims priority, application United Kingdom, Jan. 6, 1972, 583/72
Int. Cl. B60s *1/46*
U.S. Cl. 15—250.02 **7 Claims**



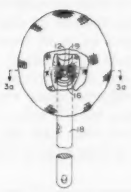
1. A vehicle including a headlamp; a wiper blade mounted for sweeping motion across said headlamp; electric motor means; current conducting windings to said motor means; means drivably connecting to said motor means to said wiper blade; a park switch operable to de-energise the electric motor means upon completion of a single cycle consisting of one or more revolutions of the motor; a counter switch wired in parallel with the park switch and constructed to maintain its contacts closed throughout a predetermined number of said cycles of the motor; conductor means connecting said windings and said park and connector switches to the vehicle electrical supply; and a normally open switch connected to the vehicle headlamp electric circuit and said conductor means for interrupting said conductor means and operable to close in response to energization of the vehicle headlamp.

3,877,105

BRUSH HAVING A HEAD OF GATHERED NET MATERIAL

Dorothy S. Breland, 1209 McCullough Ave., Huntsville, Ala. 35801

Filed July 5, 1973, Ser. No. 376,914
Int. Cl. A47l *17/04*
U.S. Cl. 15—225 **5 Claims**



1. A brush-type device comprising:

a. an elongated strip of synthetic, loose-weave net material;

b. a seam sewn along the length of said elongated strip of material gathering said strip at spaced points along said strip, thereby shortening the effective length of said strip and creating an effective thickness normal to the ungathered surface of said strip;

c. a handle having a peripheral notch;

d. said elongated strip being wound lengthwise around said handle and said notch;

e. first holding means securing the inner end region of said wound strip to said notch;

f. second holding means comprising adhesive means securing the outer end region of said wound strip to an adjacent layer of said wound strip of material.

3,877,106

WINDSHIELD WIPER BLADE ASSEMBLY AND WIPER BLADE CONSTRUCTION

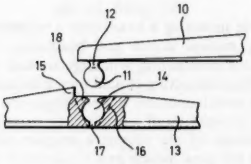
Kurt Bauer, Kleiningersheim; Wilhelm Dorr; Alfred Kohler, both of Bietigheim; Martin Weber, Grossingersheim, and Eckhardt Schmid, Guglingen, all of Germany, assignors to SWF-Spezialfabrik fur Autozubehor Gustav Rau GmbH, Bietigheim, Germany

Filed Nov. 28, 1973, Ser. No. 419,672

Claims priority, application Germany, Jan. 17, 1973, 2302154

Int. Cl. B60s *1/02, 1/38*

U.S. Cl. 15—250.42 **6 Claims**



1. A windshield wiper blade assembly comprising a main yoke member for operatively holding a wiper blade having a projecting engagement member thereon with an enlarged intermediate portion, a second member adapted to be carried by said yoke member having a top surface with a receiving recess defined therein with an enlarged intermediate portion of a size to accommodate the enlarged portion of said engagement member, the recess including a top access slot on said top surface which is smaller than the width of the maximum dimension of said enlarged portion so as to permit forced entry of said enlarged portion of said engagement member, and a bottom slot defined in said second member extending from the bottom of said enlarged intermediate portion of said recess to the bottom of said second member and permitting flexure of said second member on each side of the bottom slot in directions toward the bottom of said second member to open the top access slot so as to receive the engagement member, said second member including an intermediate wall portion bounding each end of said receiving recess intermediate portion and a generally triangular slot on each side of the intermediate wall portion with a base of the triangular slot facing the main yoke member and the apices of said slots facing the bottom slot of said second member.

3,877,107

BLOWER EQUIPMENT FOR ROLL-OVER CAR WASH

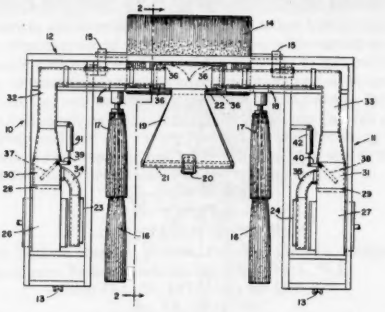
John F. Cirino, Box 191, Churchville, Pa. 18966

Filed Mar. 22, 1973, Ser. No. 343,869

Int. Cl. B60s *3/06*

U.S. Cl. 15—302 **7 Claims**

1. Roll-over type car washing equipment comprising an inverted generally U-shaped frame mounted for traveling movement lengthwise of a car washing station, means for washing a car in said station, and car drying mechanism carried by the frame and including a top air discharge nozzle mounted on the frame in position to direct drying air downwardly against upwardly presented surfaces of a car in said station and side air discharge nozzles mounted on the frame in position to direct air laterally inwardly against the side surfaces of a car in said station, and means for supplying air to the top and side nozzles comprising blower means and



means for directing air from the blower means alternatively to the top nozzle and to the side nozzles.

3,877,108

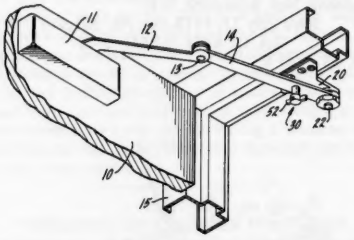
DOOR HOLD-OPEN DEVICE

Mario J. Del Fiacco, Princeton, Ill., assignor to Schlage Lock Co., San Francisco, Calif.

Continuation of Ser. No. 206,778, Dec. 10, 1971. This application Sept. 17, 1973, Ser. No. 397,952

Int. Cl. E05f *3/00*

U.S. Cl. 16—49 **1 Claim**



1. In a door hold-open device, the combination comprising:

a soffit plate for attachment to a door frame, said soffit plate having an aperture therein for receiving a ball bearing member;

a ball bearing member rotatably mounted in the aperture in said soffit plate;

a forearm pivotally affixed at one end thereof to said soffit plate, said forearm having an aperture therein and being positioned on the soffit plate so that the forearm aperture traverses said ball bearing member;

a main arm pivotally attached at one thereof to said forearm and coupled at the other end thereof to a door closing assembly;

a generally cylindrical housing disposed on said forearm and having a groove formed on a free end thereof away from said forearm;

a plunger member positioned within the cylindrical housing and having a first end thereof extending through the aperture in said forearm, the first end of the plunger member having a detent formed therein for engaging the ball bearing member in the soffit plate;

biasing means positioned within the cylindrical housing for urging the first end of the plunger member through the cylindrical housing toward the ball bearing member;

a handle member disposed on a second end of the plunger member and having camming surfaces disposed toward

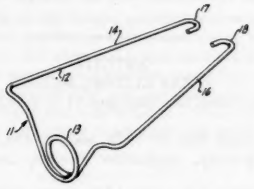
the free end of the cylindrical housing for engaging said free end, said handle member allowing the biasing means to urge the plunger member into engagement with the ball bearing member when said camming surfaces are positioned in the groove in the free end of the cylindrical housing; and

a plurality of ball bearings journaled between the free end of the cylindrical housing and the handle member to permit the handle member to turn freely.

3,877,109
HOLDER FOR FOWL

J. D. Moncrief, 3139 Woodmark Ct., Sacramento, Calif. 95821

Filed July 2, 1973, Ser. No. 375,761
Int. Cl. A22c *15/00*
U.S. Cl. 17—44.1 **2 Claims**



1. A holder for fowl having a body, neck, wings and legs, said holder comprising:

a. a continuous bar configured to provide a central loop lying in a first plane and adapted to encircle a truncated portion of the neck;

b. a pair of side portions, extending from and being symmetrically disposed with respect to said loop and lying substantially in a second plane angularly disposed relative to said first plane, said side portions being of a length and spaced apart a distance such that said side portions are capable of snugly overlying the wings and holding the wings close to the body when said loop circumscribes the truncated neck; and,

c. a pair of U-shaped portions at the ends of said side portions remote from said loop, said U-shaped portions confronting each other and lying substantially in said second plane, said U-shaped portions being spaced apart a distance such that said U-shaped portions are capable of hooking around and restraining the legs.

3,877,110
CLEANING APPARATUS

John T. McCloskey, Paramonga, Peru, and Eduardo J. Villavicenio, New York, N.Y., assignors to Process Evaluation and Development Corporation, New York, N.Y.

Filed Apr. 27, 1973, Ser. No. 355,179
Int. Cl. D01b *3/10*
U.S. Cl. 19—66 R **6 Claims**

1. Apparatus for cleaning fragments of fibrous vegetable materials to remove trash components therefrom comprising:

a. An open U-shaped tank defining an elongated path of travel from an inlet end and to an outlet end and containing a liquid medium in which the fibrous materials tend to float and the trash components will sink;

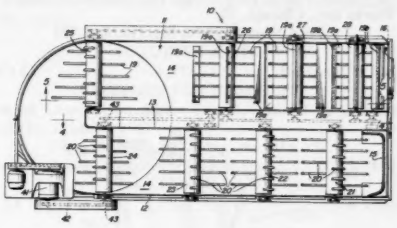
b. Means for introducing dirty fibrous material into the inlet end of the tank;

c. A trash collecting zone intermediate said inlet end and said outlet end;

d. Means for repeatedly dunking the dirty fibrous materials into the liquid medium thereby removing trash components from the fibrous materials ans simultaneosly transporting these materials from the inlet end to said trash collection zone;

e. Said trash collection zone consisting of means for transporting fibrous material through said zone and a sharply sloping trash component collection means extending downwardly from the tank bottom in the loop of the U of said U-shaped tank wherein the path of travel of fibrous material changes;

f. Further means for transporting the cleaned fibrous material from the trash collection zone toward the outlet end of the tank;



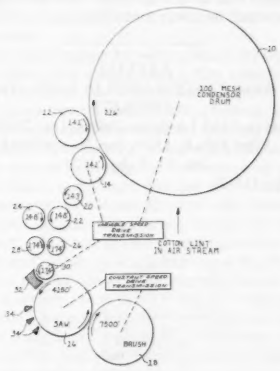
g. Means associated with the further transporting means adjacent said outlet end for draining the said liquid medium from the cleaned fibers and recirculating the same to the tank;

h. Means for periodically removing separated trash from the apex of the trash collection means without interrupting the operation of the tank.

3,877,111
LINT CLEANER

James L. Horn, Lubbock, Tex., assignor to Horn & Gladden, Lubbock, Tex.

Filed May 23, 1973, Ser. No. 363,062
Int. Cl. D01b *1/00*
U.S. Cl. 19—202 **8 Claims**



1. The method of feeding and condensing cotton to a lint cleaner comprising:

a. moving cotton in an airstream

b. condensing the cotton upon at least an 80 mesh moving condenser screen,

c. forming a compressed layer of cotton on said screen by having an air flow velocity of about 200 feet per minute through the screen with

d. a pressure drop of about 5 pounds per square foot across the screen so that it forms a compressed layer of cotton on the screen,

e. doffing the cotton from the screen,

f. passing the cotton in the form of a batt through no more than two sets of rotating directional rollers, and then

g. feeding the batt onto a rotating saw cylinder for cleaning, h. regulating the feed of the batt to the saw cylinder with a rotating feed roller.

3,877,112

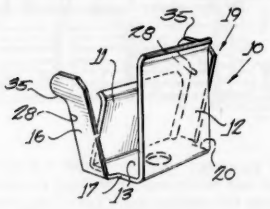
COVER CLIP

John August Pestka, Park Ridge, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Mar. 8, 1974, Ser. No. 449,395

Int. Cl. A44b *21/00*

U.S. Cl. 24—73 B **12 Claims**



1. A clip for attaching a cover panel having a planar foot of predetermined thickness to a backboard panel having an angularly turned flange of predetermined thickness, the clip comprising an upstanding front tab, an upstanding back tab spaced from the front tab in a clip depth direction, a base member interconnecting the front and back tabs in U-shaped configuration, and at least one spring arm extending upwardly from the base member and at least partially defined by a front spring arm edge and a back spring arm edge, the front spring arm edge being spaced apart from the front tab in a clip depth direction by a positive amount less than the backboard flange thickness, and the back-spring arm edge being spaced apart from the back tab in a clip depth direction by a positive amount less than the cover foot thickness.

3,877,113

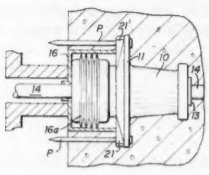
ANCHORING SYSTEM USED IN POST STRESSING CONCRETE

Cesar D. Reyes, 7217 La Bolsa, Dallas, Tex. 75240

Filed Feb. 6, 1974, Ser. No. 440,045

Int. Cl. F16g *11/04*

U.S. Cl. 24—115 M **6 Claims**



1. An anchor for tensioning a cable in a body of set concrete comprising:

an elongated cylindrical case tapering in diameter from a large end to a small end and having a bore therethrough tapering in diameter from a large opening to a small opening;

an imbedding flange formed around the outer periphery of said case;

a cylindrical insert adapted to fit securely within the small bore opening in said case, said insert being adapted to receive said cable in sealing relationship thereby preventing the ingress of moisture and unset concrete into said case through the small end;

wedge segments slidably mounted in said case, said segments being contoured on their outer surface to mate with the tapered bore in said case and having a serrated surface on their inner surface for gripping the cable;

a collapsible sealing cap encircling the larger end of said case and having an opening therein which coaxially aligns with the axis of said case when said cap is properly fitted on said case;

a cylindrical flange as an integral part of said sealing cap and defining the opening therein, said flange extending to the outside of said cap and adapted to receive said cable in sealing relationship thereby preventing the ingress of moisture and unset concrete into said case through the large end; and

flexible means positioned between said wedge segments and said sealing cap maintaining said wedge segments in assembled relationship with the tapered bore within said case.

3,877,114

STRAP GUIDING DEVICE

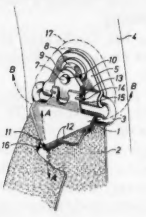
Tom Richard Silen, Bravallavagen 11 B, S-182 63 Djursholm, Sweden

Filed May 30, 1974, Ser. No. 474,411

Claims priority, application Sweden, June 13, 1973, 7308343

Int. Cl. A44b *11/00;* **A62b** *35/00;* **B60r** *21/10*

U.S Cl. 24—163 R **7 Claims**



1. A device to guide a strap (2), for example a safety belt of the reeling type in a vehicle, so that the strap when effected will maintain its original right side up position and will not be twisted or distorted, characterized in that it includes a hoop (1) attached in immediate connection to a divert element (3), that is an element through which the strap (2) can run freely, by means of a fastening element (9), and having a through-passage for the strap (2), said hoop (1) exerting the guiding function, so that the strap (2) which will thus pass through both the hoop (1) and the divert element (3) will always run right side up, but when pulled in a certain direction will be able to turn in order to align to the mentioned direction of pulling.

3,877,115

PUSHBUTTON RELEASE CONNECTOR

Franz G. R. Quinting, Clawson, and Robert W. Stoffel, Ferndale, both of Mich., assignors to International Engineering Service, Inc., Royal Oak, Mich.

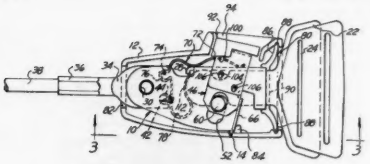
Filed May 20, 1974, Ser. No. 471,291

Int. Cl. A44b *11/26*

U.S. Cl. 24—230 R **11 Claims**

1. A releasable connector comprising an elongated frame member having an open end and a pair of substantially parallel sidewalls, a tongue member adapted for introduction into said frame member between said sidewalls through the open end of said frame member, a bifurcated slide member substantially transversely disposed over said frame member, said slide

member having a pair of parallel legs straddling said frame member each in sliding engagement with the exterior surface of one of said sidewalls, a closed slot in each sidewall and in each leg of said slide member, said closed slots having their longitudinal axis along the axis of travel of said slide member and being in transverse alignment across said frame member, a locking bar loosely disposed through said slots, an open slot



formed on a side of said tongue member, means for normally biasing said slide member in a direction urging said locking bar into said open slot when said tongue member is introduced into said frame member to a position permitting said locking bar to laterally project into said open slot, and means for manually applying to said slide member a force displacing said slide member in a direction disengaging said locking bar from said open slot.

3,877,116

PUSH BUTTON BELT FASTENER

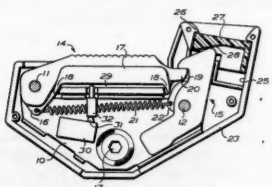
Gote Eskil Yngve Holmberg, Anderstrop, Sweden, assignor to G.E.Y. Patenter Aktiebolag, Anderstrop, Sweden

Filed Oct. 1, 1973, Ser. No. 402,645

Claims priority, application Sweden, Mar. 30, 1972, 4248/72

Int. Cl. A44f *11/26*; **A44b** *13/00*

U.S. Cl. 24—230 AP **2 Claims**



1. A lock for anchoring a strap loop forming part of a vehicle safety belt to a vehicle body structure comprising, in combination:

a U-shaped metal frame adapted to be fixedly attached to the body structure;

a metal bar pivotally mounted at one end thereof to one limb of the frame;

a latching member pivotally mounted to the other limb of the frame and extending along said other limb, for pivotal movement into and away from locking engagement with the bar at the other end thereof, locking the bar to said other limb in a position to prevent the bar from being released therefrom by an outward pulling movement, the bar in said locked position closing off an elongated slot for the reception of the strap loop;

spring means biasing the bar and the latching member to an open position and a latching position, respectively;

a housing of a plastic material, which is of a shape matched to the U-shaped frame and encloses the frame, a major part of the bar being uncovered by the housing, which forms around said other limb a cavity receiving this limb as well as the latching member and having an opening at the top;

a projecting border rib on the housing surrounding said opening; and

a recessed push button displaceably guided in said cavity, which is engageable with the upper end of the latching member by an external manual operation to pivot a cam action the latching member to a disengaged position against the spring bias, the push button being pressed against the border rib by the spring bias to be held in an at-rest position in which it is recessed in the housing and is available for manual operation through the opening of the cavity.

3,877,117

FASTENER FOR BRACELET

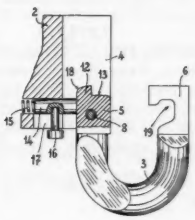
Raymond Legros, and Andre Legros, both of Le Cheylard, Ardeche, France

Filed Nov. 16, 1973, Ser. No. 416,452

Claims priority, application France, Feb. 5, 1973, 73.04558

Int. Cl. A44b *13/00*

U.S. Cl. 24—241 SL **6 Claims**



1. A fastener for a bracelet including a chain of annular links, comprising:

a plate connected to one end of said chain, said plate having a mortise in a plane parallel to its major surfaces facing away from said one end and a longitudinal bore in said plane close to one lateral edge of said plate opening into said mortise;

a U-shaped clasp engageable with a link at the opposite end of said chain, said clasp having a first extremity permanently received in said mortise and provided with pivot means joining same to said plate at a fulcrum generally in line with said longitudinal bore for enabling said clasp to swing in said plane between an open position and a closed position, said clasp having a second extremity received in said mortise in said closed position and withdrawn from said mortise in said open position, said first extremity being provided with a projecting formation and with a shoulder transversely adjoining said formation; and

slidable detent means in said plate for releasably locking said clasp in said closed position, said detent means including a spring-loaded plunger in said longitudinal bore engageable with said projecting formation and said shoulder, said plunger being provided with a transverse finger projecting from said plate for manual retraction to facilitate the opening of said clasp.

3,877,118

PROCESS FOR THE CONTINUOUS CRUSHING OF VELVET

Lindsay S. Misenheimer, and John D. Babb, Taylors, both of S.C., assignors to J. P. Stevens & Co., Inc., New York, N.Y.

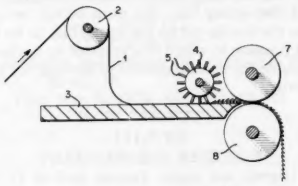
Filed Sept. 25, 1973, Ser. No. 400,586

Int. Cl. D06c *23/00*

U.S. Cl. 26—2 R **2 Claims**

1. A process of continuously crushing velvet to form a crushed velvet fabric which comprises passing a water wetted velvet along a smooth surface and overfeeding it while supported by the smooth surface to smooth nip rolls by a spiked

roll with spikes or fingers in a random pattern, the peripheral speed of the spiked roll being greater than the smooth rolls, to



produce the overfeed, whereby the wet velvet is stuffed between the rolls in a random pattern.

3,877,119

APPARATUS FOR CUTTING PILE FABRIC

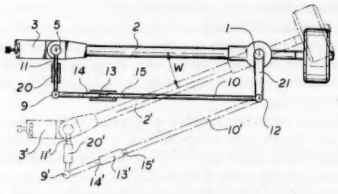
Franz Josef Gierse, Wickrathberg; Hubert Holz, Krefeld, and Ante Raguz, Huckelhoven, all of Germany, assignors to Franz Müller, Monchen-Gladbach, Germany

Filed May 23, 1973, Ser. No. 363,123

Claims priority, application Germany, May 29, 1972, 2226052

Int. Cl. D06c *13/08*

U.S. Cl. 26—9 **5 Claims**



1. A cutting arm device for a cutting machine for cutting the individual loops of a weft pile fabric such as velvet, corduroy, or the like comprising a frame, a cutting arm having one end thereof pivotally mounted on said frame for pivotal movement about a first axis, a cutting head pivotally mounted on the other end of said cutting arm for pivotal movement about a second axis, said cutting head carrying a cutting knife for cutting the pile loops of a web of material passing underneath said cutting head, said first and second pivotal axes being disposed generally parallel to one another, and actuating means operatively connected between said first and second pivot axes providing for pivotal movement of said cutting head relative to said cutting arm about said second axis as said said cutting arm is pivoted on said frame about said first axis, and cutting arm being pivotal in a plane substantially parallel to the plane of said web of material passing underneath said cutting arm, said actuating means comprising a base crank fixed relative to said machine frame and extending from said first pivot axis, a first link fixed relative to said cutting head and extending from said second axis, a second link having one end pivotally connected to said first link at a third pivot axis and another end pivotally connected to said base crank at a fourth pivot axis, and including means for adjusting the length of said first link.

3,877,120

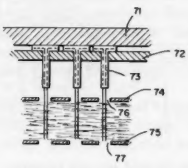
NEEDLE BOARD

Miyoshi Okamoto, Osaka; Toyohiko Hikota, Kyoto, and Kitao Shimizu, Osaka, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Continuation of Ser. No. 116,146, Feb. 17, 1971, Pat. No. 3,774,273. This application May 2, 1973, Ser. No. 356,562

Int. Cl. D04h *18/00*

U.S. Cl. 28—4 R **19 Claims**



1. In a needle board for a needle punching machine the combination comprising (a) a board with a plurality of needle holes extending therethrough, and (b) a plurality of needles mounted on said board wherein said needles are bundled as needle groups, each of said groups extending through individual holes in said board, the distance between said needles being from 300 to 5,000 microns.

3,877,121

NEEDLE PUNCHING APPARATUS

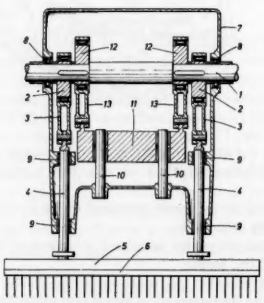
Helmut Obenaus, Leonding, Austria, assignor to Ernst Fehrer Gesellschaft mbH & Co. K.G. Textilmaschinenfabrik u. Stahlbau, Linz, Austria

Filed Feb. 4, 1974, Ser. No. 439,626

Claims priority, application Austria, Mar. 2, 1972, 1889/72

Int. Cl. D04h *18/00*

U.S. Cl. 28—4 R **7 Claims**



1. Needle punching apparatus, which comprises needle beam means carrying needle boards,

needle beam guide means for vertically guiding said needle beam means,

needle beam drive means for imparting an up and down motion to said needle beam means,

balancing weight means associated with said needle beam means,

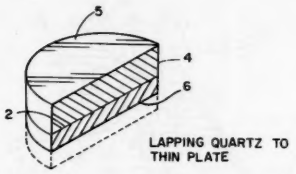
balancing weight guide means for vertically guiding said balancing weight means, and

balancing weight drive means for imparting to said balancing weight means an up and down motion in phase opposition to said needle beam means.

3,877,122
METHOD OF FABRICATING THIN QUARTZ CRYSTAL OSCILLATOR BLANKS

Richard W. Wilson, Phoenix, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Sept. 26, 1973, Ser. No. 400,998
Int. Cl. B01j 17/00
U.S. Cl. 29—25.35 8 Claims



1. A method of making a piezoelectric crystal unit from a plate of crystalline material having a pair of opposing faces of which both are smooth and flat, comprising the steps of:

depositing a backing material on the crystalline plate at a temperature below the curie point of the crystalline plate;

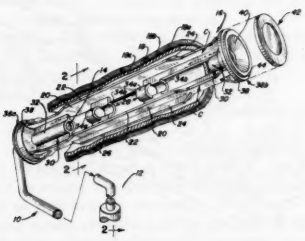
thinning the crystalline plate to a desired thickness; and

removing the backing material through chemical etching.

3,877,123
PAINT ROLLER CORE

John A. Pharris, Brookfield, Wis., assignor to E Z Painter Corporation

Filed Sept. 4, 1974, Ser. No. 503,137
Int. Cl. B21b 13/02
U.S. Cl. 29—116 R 11 Claims



1. In a paint roller having a handle and an axle disposed at generally right angles with respect to the handle, a core structure rotatably mounted on said axle for axially receiving a cylindrical paint applying sleeve, said core structure being integrally molded and including a pair of generally parallel longitudinal plates spaced from, on opposite sides of and generally parallel to the axis of said axle, said plates being engageable along the edges thereof with the interior of said paint applying sleeve for rigidly supporting the sleeve generally in the planes of said plates but having flexibility at least at their edges generally in a direction transverse to said planes, and journal means between said plates for rotatably mounting the core on said axle.

3,877,124
COATING ROLLER

David Peter Marshall Jones, Ilford, England, assignor to Ilford Limited, Essex, England

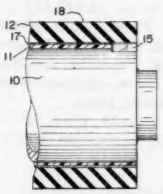
Filed Sept. 20, 1973, Ser. No. 399,137
Claims priority, application United Kingdom, Sept. 28, 1972, 44791/72
Int. Cl. B21b 27/02
U.S. Cl. 29—121 H 1 Claim

1. An apparatus for treating web material, said apparatus comprising at least one power-transmitting roller for driving said web material and comprising a rigid roller, the outer surface of which is covered with a helically wound stainless steel wire having a diameter of from 0.00635 to 0.0635 cm. and a resin filling the interstices between said stainless steel wire and said roller.

3,877,125
METHOD FOR A TUBULAR ROLLER SLEEVE

John O. Finzer, Wilmette, Ill., assignor to Finzer Roller Company, Wilmette, Ill.

Filed Feb. 11, 1974, Ser. No. 441,326
Int. Cl. B21h 1/14; B23p 11/00
U.S. Cl. 29—148.4 D 7 Claims



1. The method of making a rubber-sleeved roller which comprises providing a metal core, providing an inner sleeve of tubular form having an inside diameter to provide a close fit on the outside surface of said core, forming a tubular sleeve of rubber having an inside diameter to provide a substantially close fit between said inner tubular sleeve and the tubular rubber sleeve, said tubular rubber sleeve being adhered to said inner sleeve by a layer of adhesive filling the area between the rubber sleeve and said inner sleeve, finish grinding and polishing said tubular rubber sleeve to provide a smooth outer peripheral surface, and mounting said finished tubular sleeve on said metal core with said inner sleeve in engagement with and secured to said metal core.

3,877,126
PROCESS FOR THE MANUFACTURE OF LINE AND/OR SPACE FOR RECEIVING OR CONDUCTING HOT GASES

Herbert Deutschmann, Friedrichshafen; Wolfgang Kurczek, Nellingen, and Karl-Heinz De Lazzer, Friedrichshafen, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Germany

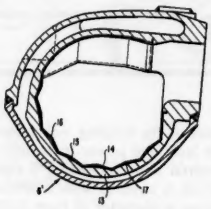
Division of Ser. No. 59,060, July 29, 1970, Pat. No. 3,750,403.
This application June 6, 1973, Ser. No. 367,356
Int. Cl. B23p 15/00
U.S. Cl. 29—156.4 WL 18 Claims

1. A process of manufacturing a construction for handling high temperature mediums comprising:

forming a construction for accommodating a high temperature medium by the steps of

casting a rigid structure for said construction,

arranging a heat resistant sheet liner prior to said casting of said rigid structure so that said rigid structure and sheet liner are formed during said casting step into said construction with said sheet liner disposed inside said rigid structure, said sheet liner having a plurality of predetermined fold lines, and



cooling the thus formed construction of rigid structure and sheet liner to form a plurality of separate insulating air spaces between inside walls of said rigid structure and outer peripheral walls of said sheet liner, said plurality of insulating air spaces being formed by bending said sheet liner along said fold lines, thereby forming said plurality of insulating air spaces between alternate ones of said plurality of fold lines and said inside walls of said rigid structure.

3,877,127

VANE PUMP HOUSING

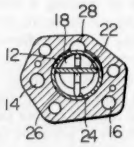
Koichi Takahashi, Yokohama; Nobuteru Hitomi, Yokosuka; Tokiyoshi Yanai, Yokosuka, and Manabu Tsunematsu, Yokosuka, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Sept. 24, 1973, Ser. No. 399,716

Claims priority, application Japan, Sept. 28, 1972, 47-96642

Int. Cl. B23p *15/00*

U.S. Cl. 29—156.4 WL **3 Claims**



1. A method of manufacturing a housing for a vane pump, wherein vanes are slidably inserted through slots provided in a rotor, radially opposed vane edges protruding from the slots, the method comprising the steps of:

forming in a casing a bore with a substantially circular profile;

inserting a loosely fitting annular resilient sleeve into said bore;

inserting the rotor and vane assembly into said resilient sleeve to be rotatable relative to and within said resilient sleeve about a center which is a predetermined distance from the center of the substantially circular profile, and deforming a portion of said resilient sleeve radially inward by a predetermined amount in a direction of a line containing both centers, to form said housing,

wherein vane edges are caused to be in continuous slidable contact with the interior surface of said resilient sleeve at all positions of the rotatable rotor and vane assembly.

3,877,128

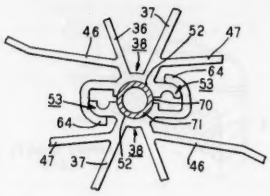
METHOD OF PRODUCING A FINNED TUBE HEAT EXCHANGER

Alan R. Tibbetts, Costa Mesa, and Donald R. Tucker, Lakewood, both of Calif., assignors to Airco, Inc., New York, N.Y.

Division of Ser. No. 224,320, Feb. 7, 1972, Division of Ser. No. 792,593, Jan. 21, 1969, Pat. No. 3,672,446. This application Feb. 21, 1973, Ser. No. 334,496

Int. Cl. B21d *53/02*; **B23p** *15/26*

U.S. Cl. 29—157.3 A **2 Claims**



1. A method of clamping a pair of identical finned assemblies to a tubular member comprising, placing said assemblies on said tubular member, simultaneously bending a movable member on each of said assemblies over a fixed member on the other of said assemblies so that said assemblies are locked to said member.

3,877,129

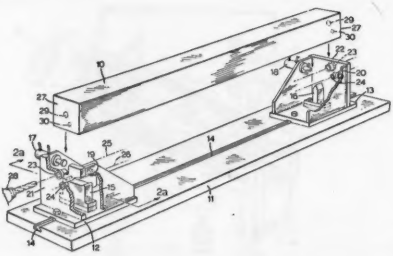
APPARATUS FOR THE FABRICATION OF STRUCTURAL COLUMN MEMBERS

Richard N. Dobson, Village of Creemore, Ontario, and Gordon A. Webster, Town of Dundas, Ontario, both of Canada, assignors to Dominion Foundries Street Limited, Hamilton, Ontario, Canada

Division of Ser. No. 220,297, Jan. 24, 1972. This application Jan. 29, 1973, Ser. No. 327,348

Int. Cl. B23p *19/00*, *17/00*

U.S. Cl. 29—200 P **5 Claims**

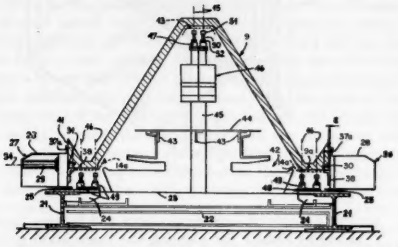


1. Apparatus for the production of a structural column member constituted by an elongated steel billet of solid square or rectangular cross section, the apparatus comprising a flat planar base having a longitudinal axis, means for supporting one end of the member on the base by two spaced points or two spaced edges parallel to the said axis and engaging an end portion of the member, means for supporting the other end of the member on the base by a single point or a single edge parallel to the said axis and engaging an end portion of the member, and drilling jig fixtures for each end of the column member for guiding drilling mechanism in drilling coaxial first and second holes in the two ends of the member, each two coaxial holes establishing by being coaxial therewith corresponding first and second spaced, straight longitudinal axes for the column member accurately parallel to the said axis of the base.

3,877,130
ROOF COMPOSED OF MULTIPURPOSE SELF-SUPPORTING LONGITUDINAL ELEMENTS, METHOD AND INSTALLATION FOR ITS MANUFACTURE

Alain Champot, Baron-sur-Odon, France, assignor to Ateliers de Construction Metalliques de Caen

Division of Ser. No. 276,127, July 28, 1972, Pat. No. 3,799,247. This application Dec. 17, 1973, Ser. No. 425,331
Claims priority, application France, Aug. 4, 1971, 71.28624
Int. Cl. B23p *19/00*
U.S. Cl. 29—200 P **2 Claims**



1. Apparatus for the manufacture of a self-supporting roof element embodying illuminating devices and heating devices, said apparatus comprising

a. an elongated horizontally extending stand,

b. an elongated supporting member extending along the longitudinal center line of said stand,

c. a plurality of substantially vertically extending columns substantially equally spaced along the longitudinal center line of said stand and projecting upwardly from said supporting member,

d. seats

1. disposed on the upper portion of said columns,

2. including upper faces which are disposed in horizontal uniplanar relation to each other, and

3. including means for inserting securing and centering means in such illuminating devices,

e. two lower supporting members disposed on opposite sides of said first mentioned supporting member in substantially equally spaced parallel relation thereto,

f. other seats

1. mounted on and substantially equally spaced along said lower supporting members,

2. including upper faces which are disposed in horizontal uniplanar relation to each other, and

3. including means for inserting securing and centering means in such heating devices,

g. supporting means extending along one side of said stand and including a face of abuttingly engaging one side of such a roof element,

h. a plurality of positioning stations disposed at one side of said stand outwardly of said seats and spaced substantially equally along said stand,

i. each of said stations comprising a jack including a centering pin movable through said supporting means into such a roof element abuttingly engaged with said face of said supporting means,

j. a plurality of other stations disposed at the side of said stand remote from said one side and spaced substantially equally along said stand outwardly of said seats,

k. each of said other stations being disposed opposite to a respective one of said first mentioned stations and comprising a jack including a pushing pin engageable with such a roof element for pushing said roof element against said face of said supporting means,

l. said centering pins being disposed in uniplanar relation to each other,

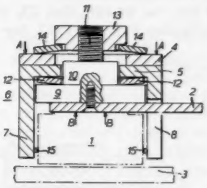
m. said pushing pins being disposed in uniplanar relation to each other, and

n. said first mentioned and second mentioned jacks being connected to a unitary source of working fluid for simultaneously actuating the same.

3,877,131
PRESSURE MOUNTING ASSEMBLIES

Nigel Grenville Hobdey, Lincoln, England, assignor to AEI Semiconductors Limited, Lincoln, England

Filed May 17, 1974, Ser. No. 471,002
Claims priority, application United Kingdom, May 17, 1973, 23470/73
Int. Cl. H05k *13/04*
U.S. Cl. 29—203 B **15 Claims**

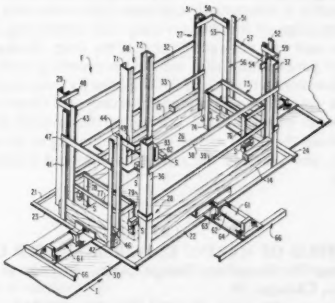


1. A pressure mounting assembly for pressure mounting an electronic component to a body including spaced first and second reaction members with resilient means positioned therebetween and an indicating member held firmly in one position by means of pressure exerted on the reaction members by the resilient means, mounting means for causing compression of said resilient means whilst said component is being mounted, said compression releasing said indicating member from its said firmly held position when a predetermined desired mounting pressure is reached.

3,877,132
MACHINE FOR ASSEMBLING STRUCTURES SUCH AS FRAMES

Marion O. Fogle, Rt. 3, Box 377F, Orangeburg, S.C. 29115

Filed Aug. 3, 1973, Ser. No. 385,431
Int. Cl. B23q *7/10*
U.S. Cl. 29—211 R **10 Claims**



1. Apparatus for fabricating building structures of the type having a pair of end structural elements and a pair of side structural elements comprising in combination, a substantially rectangular frame including a pair of side frame members arranged in spaced parallel relationship and a pair of end frame members arranged in spaced parallel relationship means on each of said frame members for supporting at least

one of said side structural elements in a storage position, means on each of said end frame members for supporting at least one of said end structural elements in a storage position, said supporting means including clamping means for moving said side and end structural elements from said storage position into an assembly position with adjacent positions of said elements in abutting engagement to form a building structure having joints, fastening means on said frame for securing said elements together at said joints to form an assembled building structure, said clamping means being arranged to release said assembled building structure for removal of said structure from said frame.

3,877,133

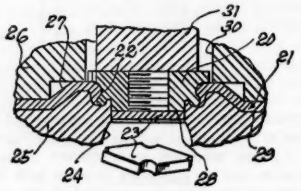
PIERCE NUT APPLYING METHOD

William L. Grube, Lake Bluff, Ill., assignor to MacLean-Fogg Lock Nut Co., Mundelein, Ill.

Division of Ser. No. 83,408, Oct. 23, 1970, abandoned. This application Feb. 23, 1973, Ser. No. 335,235

Int. Cl. B23p *17/00, 11/00*

U.S. Cl. 29—417 **4 Claims**



1. The method of effecting the attachment to a metal panel of pierce nuts having two surfaces at the ends of shank portions and adjoined in a composite strip which strip embodies a series of correspondingly oriented and substantially discrete nuts joined together in aligned relationship by connecting means having flexibility in a direction normal to the top surfaces of the nuts, said method comprising the steps of locating the panel over a die with the panel engaging a top surface of the die, advancing the end nut of the strip over the panel to a predetermined position over the die by engaging and moving a fixed distance a transverse surface of the nut, the panel being disposed between the shank portion of said end nut and die and engaging an elevated supporting surface of the die which surrounds a substantially coplanar and continuous peripheral cutting edge of the die, severing said connecting means between said end nut and the rest of the strip, flexing a portion of the panel within said elevated supporting surface toward and into contact with said cutting edge by force applied to the shank portion of said nut and piercing said flexed portion of the panel with the shank portion of the severed nut to cut a slug from the panel and effect the mounting of the nut on the panel, and securing the nut in its mounted position on the panel.

3,877,134

METHOD OF MAKING UNIVERSAL WAFER CARRIER

Thomas W. Shanahan, Tempe, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Jan. 2, 1974, Ser. No. 430,319

Int. Cl. B23p *17/00*

U.S. Cl. 29—417 **4 Claims**

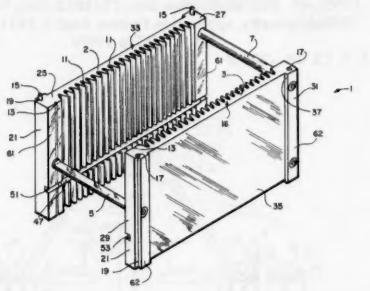
1. A method for assembling a universal wafer carrier for use in automatic wafer handling machinery comprising the steps of:

providing a length of aluminum stock material from which the side elements of the wafer carrier are to be formed;

passing such aluminum stock through an extrusion die for forming wafer holding grooves simultaneously with the formation of a wafer orientation notch;

dividing said extruded aluminum stock into at least two pieces;

forming at least a single additional groove perpendicular to both the notch and grooves previously formed in each of the pieces;



selecting a pair of individual pieces and placing them in an assembly fixture for aligning the orientation grooves in said pieces; and

selecting a plurality of separator bars and placing them between the pieces and joining the plurality of separator bars to the pieces by staking.

3,877,135

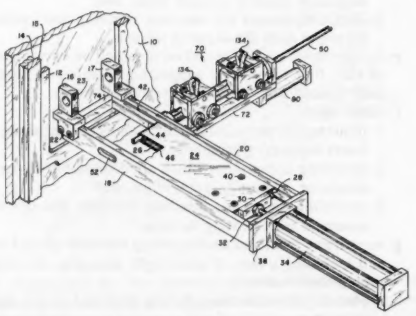
METHOD AND APPARATUS FOR APPLYING PLASTIC GRIPS TO WIRE BAIL HANDLES

Raymond A. Heisler, 657 Dakota Trail, Franklin Lakes Township, Bergen County, N.J. 07417

Filed Sept. 25, 1974, Ser. No. 509,002

Int. Cl. B23p *19/00*

U.S. Cl. 29—429 **16 Claims**



1. In an apparatus for applying plastic tubing grips to wire bail handles prior to their forming for mounting on containers, this bail forming mechanism adapted to receive, feed, cut and form wire so as to provide a wire bail for attachment to an eared container; an associated plastic grip applying apparatus including a plastic tubing receiving and advancing mechanism having a check mechanism disposed to engage the tubing so as to permit only a forward passage of the tubing and a movable gripping mechanism disposed to grip the tubing when moved in an advancing motion from a delivery start to a delivery completed position and to slide on the tubing when

moved from the delivery completed to the delivery start position and in conjunction therewith an improved apparatus for the cutting and transfer of said advanced tubing including: (a) a pair of guide rails secured to and carried by the wire bail-forming mechanism; (b) upper and lower finger members supported and carried by said guide rails and reciprocably movable with respect thereto, said fingers spaced so that an advancing tubing may be fed therebetween, said fingers further having at least one of the forward end portions bent at its distal portion toward the other to provide gripping means for releasably retaining a transversely disposed cut length of tubing, at least one of said forward ends having an adjacent length sufficiently unrestrained so that it may be deflected slightly away from the other to release the cut length of tubing, this end portion having sufficient residual bias to permit deflection thereof after which the bias causes it to return to a tubing retaining condition; (c) means for simultaneously moving the fingers from a rear, tubing receiving position to a forward position whereat the interior passageway of the cut tubing is brought substantially into coincidence with the path of an advancing wire of the bail-forming mechanism, the advancing wire passing through the tubing to retain the tubing on this wire as the finger members are moved from the bail-applying mechanism, the tubing now mounted on the wire is detached from the finger members which absent the forwardly transported cut tubing are now moved to their rear, tubing receiving position, and (d) means for cutting the advanced tubing to a determined length at a period in the cycle sequence which is at least prior to the advancement of the fingers forwardly with a cut length of tubing.

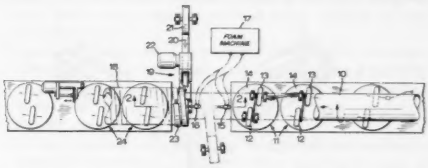
11. In a method for applying plastic tubing grips to wire bail handles prior to their forming for mounting on containers, this bail-forming mechanism adapted to receive, feed, cut and form wire so as to provide a wire bail for attachment to an eared container; an associated plastic grip applying apparatus including a plastic tubing receiving and advancing mechanism having a check mechanism disposed to engage the tubing so as to permit only a forward passage of the tubing and a movable gripping mechanism disposed to grip the tubing when moved in an advancing motion from a delivery start to a delivery completed position and to slide on the tubing when moved from the delivery completed to the delivery start position and in conjunction therewith an improved method for the cutting and transfer of said advanced tubing including the steps of: (a) mounting a pair of guide rails to the wire bail-forming mechanism and substantially normal to the main plate thereof; (b) providing a pair of upper and lower finger members and means for the reciprocal movement within said guide rails by these finger members and spacing said fingers so that an advancing tubing may be fed therebetween; (c) bending the distal portion of at least one of the forward end portions of the finger members toward the other to provide gripping means for releasably retaining therebetween a transversely disposed cut length of tubing and forming at least one of said forward ends and an adjacent length so as to be sufficiently unrestrained whereby it may be deflected slightly away from the other to enable releasing the cut length of tubing, this end portion having a sufficient residual bias to permit this deflection during the releasing of the tubing after which said bias causes a returning of the finger members to a tubing retaining condition; (d) simultaneously moving the fingers from a rear, tubing receiving position to a forward position therewith positioning the interior passageway of the cut tubing substantially in the path of an advancing wire of the bail-forming mechanism, the advancing wire passing through the tubing to retain the tubing on this wire; (e) removing the finger members from the cut tube by moving the finger members from the bail-applying mechanism, the tubing now mounted on the wire is detached from the finger members which absent the forwardly transported cut tubing are now moved to the rear, tubing receiving position, and (f) cutting the advanced tubing to a determined length at a period in the cycle sequence which is at least prior to the advancement of the finger members forwardly with another cut length of tubing.

3,877,136

METHOD OF THERMALLY INSULATING PIPE

Steve W. Groch, Bolton, Ontario, and Harold F. Jarvis, Moffat, Ontario, both of Canada, assignors to Shaw Pipe Industries Ltd., Rexdale, Ontario, Canada

Filed May 30, 1972, Ser. No. 257,844
Int. Cl. B32b *5/18*
U.S. Cl. 29—455 **2 Claims**



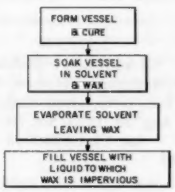
1. A method of thermally insulating pipe, which comprises continuously rotating the pipe about a substantially horizontal axis while advancing the pipe at a uniform speed longitudinally through a first position, frothing onto an upper region of the surface of the pipe at said first position a plastic foam mix so as to coat said surface progressively along its length, continuously forming at a second position adjacent to the first position a metal tube of larger diameter than the pipe, the metal tube being formed coaxially with the pipe by continuously feeding a preheated metal strip having parallel edges in a direction transverse to said axis and continuously coiling the strip along a helical path while joining together the edges of adjacent convolutions of the strip to form a moisture-proof helical seam, continuously advancing the tube at said uniform speed longitudinally from said second position to define between the pipe surface and the tube an annular space, and maintaining the pipe at a temperature at which the mix constituents will react to form a foamed mass enveloping the pipe and filling said annular space.

3,877,137

METHOD OF MAKING IMPLANTABLE PRESSURE SENSOR

Salomon Hakim, Bogota, Colombia, and Donald L. Harris, Miami Beach, Fla., assignors to Hakim Company Limited, Saint Vincent, British W. Indies

Filed May 30, 1974, Ser. No. 474,518
Int. Cl. B21d *39/02*
U.S. Cl. 29—463 **3 Claims**


FORM VESSEL & CURE
SOAK VESSEL IN SOLVENT & WAX
EVAPORATE SOLVENT LEAVING WAX
FILL VESSEL WITH LIQUID TO WHICH WAX IS IMPERVIOUS

1. The method of making an implantable pressure sensor, said method comprising:

forming a silastic material into the form of a vessel and curing said material;

soaking the cured silastic vessel in a mixture of a hydrocarbon solvent and a wax;

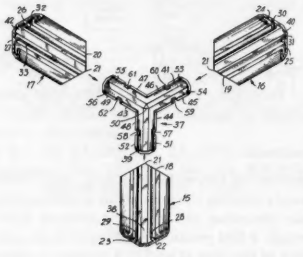
removing the vessel from said mixture and allowing the absorbed solvent to evaporate; and

at least partially filling said vessel with a liquid, the liquid being displaceable with respect to the vessel in response to pressure applied to said vessel.

3,877,138
METHOD OF MAKING MITER FRAME CORNER CONSTRUCTION

Bernard Suchowski, New York, N.Y., assignor to The Hartz Mountain Corporation, Harrison, N.J.

Division of Ser. No. 174,779, Aug. 25, 1972, Pat. No. 3,767,237. This application Apr. 25, 1973, Ser. No. 354,207
Int. Cl. B23q *3/00*
U.S. Cl. 29—468 **1 Claim**

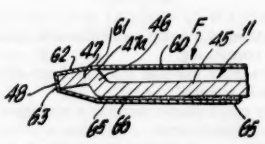


1. A method of making a miter corner construction comprising the steps of providing three frame members proportioned for mated engagement at their respective forward ends, each frame member having two spaced parallel longitudinally extending ribs forming a cavity therebetween, providing a three-branched connector clip proportioned for slidable placement within said respective cavities, the thickness of said respective branches being less than the height of the adjacent ribs, the laterally opposite edges of said branches having notched portions therein, slidably interengaging said three frame members with the respective corresponding branches of said connector clip, slidably moving said members towards each other along said respective branches until the forward ends of the members come into mutual mated engagement, whereby said branches are disposed within corresponding cavities of said members and the ribs extend above the adjacent clip branches, moving a swaging tool along a substantially single unidirectional path toward and into contact with the interengaged frame members and connector clip, thereby in a single operation swaging sections of said respective ribs inwardly into the notched portions of the adjacent branches and simultaneously swaging other selected sections of said respective ribs inwardly into overlying engagement with the adjacent branches, whereby said frame members and said connector clip are thereafter held locked against both transverse and longitudinal movement relative to each other.

3,877,139
GLASSLESS MIRROR

Eugene Martinez, Irvington-on-Hudson, N.Y., assignor to Kamar Products, Inc., Irvington-on-Hudson, N.Y.

Filed Aug. 30, 1973, Ser. No. 392,987
Int. Cl. G02b *5/08*
U.S. Cl. 29—469.5 **19 Claims**

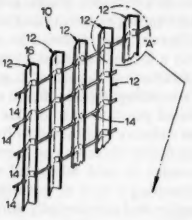


1. A process for making a mirror comprising placing a flat piece of deformable material over a cavity of a female die having a cavity and formed with a bottom surface, an inner surface extending up from the periphery of said bottom surface, and a top flange sloping downwardly and outwardly from a peripheral ridge at the upper end of said inner surface which ridge is in in a two dimentional plane, with said piece over said ridge and contacting said ridge on a first line of contact and extending beyond said ridge all around and overlapping said sloping flange, applying a male die over the piece and over said sloping flange, and applying pressure on said male die to press the piece against said ridge on said first line of contact and cause the piece to flow into said cavity and be pressed against said flange, whereby to form a pan having a bottom portion contacting the bottom surface of said cavity, a portion inclined upwardly and outwardly from the periphery of said bottom portion and a portion pressed against said ridge of said female die all around, and a ridge portion contacting said flange, whereby said ridge portion of said pan lies in a flat plane conforming to the flat plane of the ridge of the female die, then applying a mirror film to the ridge of the pan in contact with said pan ridge and causing said film to contact said sloping portion of said pan and to be attached to said pan and to have a flat mirror surface over said cavity.

3,877,140
METHOD OF MANUFACTURING A FENCE OF THERMOPLASTIC PICKETS WITH EMBEDDED WIRE CONNECTING LINKS

Hermann Adolf Josef Topolsek, 3 Horwood Dr., Brampton, Ontario, Canada

Filed June 30, 1972, Ser. No. 267,897
Int. Cl. B23p *25/00*; **B29c** *17/02*, *17/14*
U.S. Cl. 29—527.1 **4 Claims**



1. A method of manufacture of a fence having a plurality of pickets, each of said pickets comprising a creased bar-like component extending substantially for the full height of the fence at each said picket; said picket being substantially parallel one to another, and spaced along the length of said fence; there being a plurality of connecting links secured to each of said pickets and arranged substantially lengthwise of said fence between adjacent ones of said pickets; wherein said pickets are formed of a thermoplastic material; said method comprising the steps:

a. extruding a sheet of thermoplastic material whose width is at least equal to the height of the fence to be formed at any given picket therein; where said sheet is extruded having a plurality of wires embedded lengthwise therein, the number of wires being equal to the number of links between said pickets;

b. cutting said extruded sheet across its width, but not said plurality of wires, so as to form a picket portion each time a cut is made;

c. clamping said wires on the side of said cut picket portion closest to the place where it is extruded, and pulling each picket portion in turn away from the place where it is cut, so as to move said picket portion longitudinally along said plurality of wires embedded in said extruded thermoplastic sheet and thereby to form said pickets and said connecting links therebetween;

d. creasing said pickets and the wires embedded therein along the axial length of said pickets; and allowing said pickets to cool so as to rigidify the same.

3,877,141

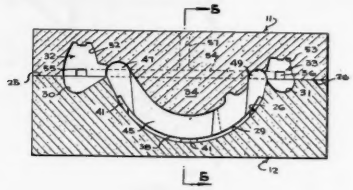
METHOD FOR MAKING BRAKE SHOES

Harry Bradshaw, Newport News, Va.; Hunter R. McKenney, Prattville, Ala., and Roland W. McKenzie, Culpeper, Va., assignors to Standard Forge and Axle Company Incorporated, Montgomery, Ala.

Continuation of Ser. No. 366,039, June 1, 1973, abandoned, which is a division of Ser. No. 174,634, Aug. 25, 1971, Pat. No. 3,753,460. This application July 5, 1974, Ser. No. 486,671

Int. Cl. B23p *17/04*

U.S. Cl. 29—527.5 **8 Claims**



1. A method of making a brake shoe having a curved table section provided with a continuous arcuate surface suitable for mounting a brake lining directly thereon, and at least one rib section disposed on the concave side thereof, comprising forming a cavity having the desired configuration of said brake shoe and cooperating sprue, runner and riser cavities in at least one of the cope and drag sections of a casting mold so that the surface of the cavity portion adapted to form the outer surface of the table section of said brake shoe is provided in only one of said cope and drag sections and the axis of curvature of the surface of said cavity portion adapted of said brake shoe is disposed substantially parallel to the parting line of said cope and drag sections, pouring molten metal through said sprue and runner into said mold cavities, removing the cast brake shoe from the mold assembly after the molten metal has cooled, cleaning the casting and heat treating the cleaned cast brake shoe.

3,877,142

METHOD OF MAKING A ROTARY ELECTRIC MACHINE ESPECIALLY SUITABLE FOR USE AS A STARTER FOR AUTOMOTIVE VEHICLE ENGINES

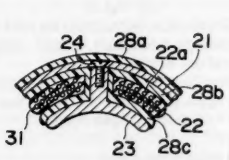
Satoru Hamano, Kariya; Takeshi Imai, Oobu; Takeshi Kimura, Hekinan, and Shiro Goto, Nagoya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya-shi, Aichi-ken, Japan

Continuation-in-part of Ser. No. 211,401, Dec. 23, 1971, abandoned. This application Nov. 9, 1973, Ser. No. 414,523

Claims priority, application Japan, Dec. 27, 1970, 45-126111

Int. Cl. H02k *15/02*

U.S. Cl. 29—596 **6 Claims**



1. A method of making a rotary electric machine suitable for use as a starter for automotive vehicle engines which comprises a generally cylindrical yoke, a plurality of pole cores each fixed to said cylindrical yoke through a central projecting portion and a plurality of field coils each wound in a space defined by the cylindrical yole, the pole core and the central projecting portion, said method comprising the steps of:

forming an electrically insulating coating on the inner surface of said generally cylindrical yoke;

forming an electrically insulating coating on the surfaces of said pole cores opposite to said inner surface of said cylindrical yoke;

forming a conductor of a plurality of randomly bundled, electrically insulated wires, said wires forming a plurality of parallel conductive paths through said conductor and rendering the cross-sectional shape of said conductor readily deformable;

winding said conductor formed of said plurality of randomly bundled, electrically insulated wires directly on one of said central projecting portions and within said space, and thereafter continuously winding said conductor directly on another central projecting portion in sequence in order to form said field coils, each of said field coils having plural numbers of winding turns; and

applying an electrical insulator to fill gaps between said field coils and said cylindrical yoke and said pole cores.

3,877,143

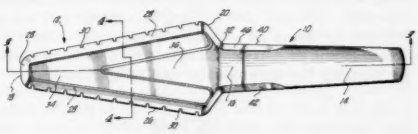
PASTRY TOOL OR IMPLEMENT

Edward N. Montesi, Barrington, R.I., assignor to Dart Industries Inc., Los Angeles, Calif.

Filed Aug. 5, 1974, Ser. No. 494,951

Int. Cl. B26b *11/00*

U.S. Cl. 30—114 **8 Claims**



1. A pastry tool for cutting and serving products, particularly pies and including:

a blade member having top and bottom surfaces and at least two opposed edges each of said edges being beveled to a knife edge, said blade top surface further including peripherally extending recessed portions positioned adjacent the beveled knife edge and extending laterally across said top surface;

a handle protruding rearwardly from said blade; and,

an integral connector extending between said blade member and said handle in a distinct angular relationship to each, said connector including along each edge thereof a beveled portion that additionally extends into and partially along the edges of said handle.

3,877,144

FISHING ACCESSORY

Michael P. LeBlanc, 9301 Burning Tree Rd., Bethesda, Md. 20034

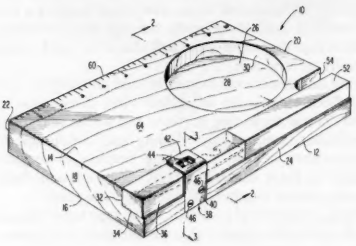
Filed Feb. 20, 1974, Ser. No. 444,145

Int. Cl. B25f *1/00*; **B26b** *11/00*

U.S. Cl. 30—124 **1 Claim**

1. A fishing accessory comprising a generally flat, elongated member having generally parallel upper and lower surfaces and side edges joining said surfaces, means on the said upper surface for receiving a bait container and restraining the said bait container against lateral motion, and a knife attached to said elongated member, said elongated member having a portion of said upper surface adjacent said means for receiving said bait container which serves as a bait cutting surface,

said means for receiving a bait container comprising a depression in said upper surface, said knife including a sheath, knife blade and handle mounted along one of said side edges, said blade having a cutting edge and a serrated edge suitable for scaling fish, said flat elongated member, said sheath and said knife handle being wooden and said flat elongated member having a cutaway portion thereof adjacent one side of the handle of said knife to permit gripping of the said handle by the fingers of the user, said generally flat elongated member being longer in its elongated direction than in the horizontal direction normal thereto and the longitudinal axis of the knife



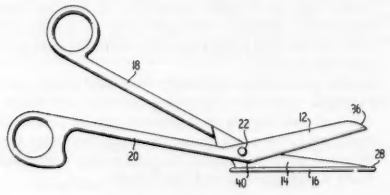
blade extending substantially parallel to an edge of said elongated member substantially parallel to the long axis of said elongated member, said depression being disposed near one end of the upper surface of said elongated member, a bottle opener formed in one edge of said knife blade, a measuring scale on said upper surface of said elongated member, said sheath and said handle being received within a slot extending along said edge of said elongated member where said knife is mounted, with said sheath being secured to said elongated member by means of a metal clip having a vertical leg attached to said edge of said elongated member and a horizontal leg engaging the uppermost surface of said sheath.

3,877,145

SCISSORS FOR SURGICAL AND OTHER USES

Bertrand J. Andrews, 106 Shannon St., Middlebury, Vt. 05753

Filed Dec. 18, 1973, Ser. No. 425,776
Int. C!. B26b *13/00*
U.S. Cl. 30—231 **6 Claims**



1. A scissors comprising:

an upper blade having a handle at one end and a cutting edge at the other end, said upper and lower blades being pivotally connected at a pivot point such that the cutting edges of said blades intersect for cutting purposes when the scissors is operated, and

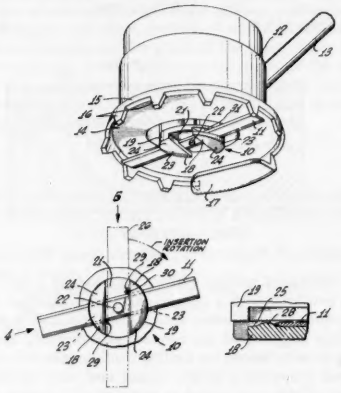
flange means having rounded edges and a substantially planar lower surface integral with the base of the lower blade, the cutting edges of said lower blade extending upwardly from a substantially central portion of said flange means and at a predetermined distance from the forward edge and wherein the flange means extends only a short distance beyond the rear portions of the upper and lower blades to limit exposure of the cutting edges and wherein said upper blade is of a straight configuration which rests on the flange means adjacent the lower blade when the scissors is in a closed position.

3,877,146

ROTATING BLADE HOLDER

Charles B. Pittinger, Woodland Hills, Calif., assignor to Allegretti & Company, Chatsworth, Calif.

Filed Nov. 28, 1973, Ser. No. 419,597
Int. Cl. B26b *7/00, 15/00*
U.S. Cl. 30—276 **5 Claims**



1. A holder for releasably securing a blade to rotational drive means, comprising:

a holder body connectable to the rotational drive means and having a generally flat end face for holding the blade;

a central stud projecting axially from said end face to engage a central hole in the blade;

a pair of resiliently deformable retaining fingers formed integrally with said holder body, oppositely extending across said flat end face in parallel relation with each other and with said end face, and spaced equidistantly from said central stud to form a recess for receiving the blade in an assembly position;

a convex rib under each of said retaining fingers, sized to bear against the blade and thereby bend said retaining fingers on rotation of the blade from the assembly position to a locking position with opposite halves of the blade under said retaining fingers, and to act as a detent to restrain the blade from inadvertent movement from the locking position; and

a shoulder formed where each of said fingers joins with said flat end face, said shoulder preventing further movement of the blade beyond the locking position and acting to transmit driving torque to the blade.

3,877,147

DISPOSABLE SCALPEL HANDLE

Clinton M. Cummings, Southbury, Conn., assignor to Acme United Corporation, Bridgeport, Conn.

Division of Ser. No. 306,322, Nov. 14, 1972, Pat. No. 3,817,077. This application June 25, 1973, Ser. No. 373,513
Int. Cl. B26b *5/00*
U.S. Cl. 30—329 **4 Claims**

1. A scalpel handle comprising:

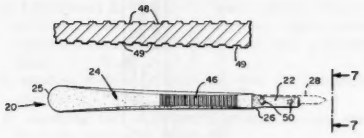
A. a handle portion completely symmetrical about its longitudinal axis, wherein said handle portion is substantially flat and incorporates a plurality of grooves positioned on both sides of said handle portion with the grooves on one

side being offset from the grooves on the other side, and

B. a blade mounting portion,

a. extending from said handle portion,

b. incorporating two substantially flat parallel blade mounting surfaces positioned for securement of a blade on either of said surfaces, and



c. being completely symmetrical about the longitudinal axis of said handle portion,

whereby a surgical blade can be mounted to said mounting portion on either side thereof for use by either right handed or left handed persons.

3,877,148

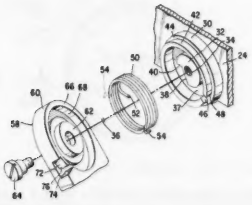
SPRING ASSEMBLY FOR THE LOWER GUARD OF A CIRCULAR SAW

Robert H. Huber, Easley, S.C., assignor to The Singer Company, New York, N.Y.

Filed July 22, 1974, Ser. No. 490,467

Int. Cl. B27g *19/04*

U.S. Cl. 30—391 **6 Claims**



4. A blade guard assembly for a portable circular saw having a housing in which a circular saw blade is mounted for rotation on operation of the saw comprising:

a. a fixed guard formed on the housing to enclose the top portion of the circular saw blade,

b. a boss formed on the fixed guard including an internal hub and an external rim,

c. a coil spring disposed in the boss with its inner end held by the hub and its outer end held by the rim,

d. a lower guard having a cam surface and which guard is adapted to be pivotally connected to the fixed guard, and

e. a screw means pivotally connecting the lower guard to the fixed guard whereby forcing of the cam surface to engage the end of the spring held by the rim will cause the end of the spring to seat upon the cam surface out of engagement with the rim so that one end of the spring will be held at the fixed guard and the other end of the spring will be held at the lower guard to permit any movement of the lower guard to tighten the spring and bias the lower guard back to its original position.

3,877,149

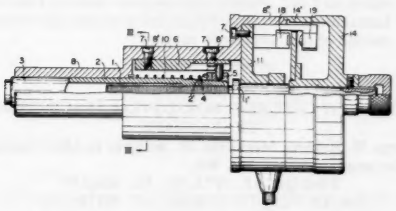
ACCURACY REGULATING MEANS FOR A LINEAR MICROMETER

Minoru Masuda, Kawasaki, Japan, assignor to Yehan Numata, Yokohama, Japan

Continuation-in-part of Ser. No. 200,757, Nov. 22, 1971, abandoned. This application Nov. 12, 1973, Ser. No. 414,835

Int. Cl. G01b *3/18*

U.S. Cl. 33—166 **7 Claims**



1. In a linear micrometer comprising an outer sleeve, a spindle axially slidable within said sleeve, threaded means engaging mating threads on said spindle and rotatably mounted on said outer sleeve, and means for preventing rotation of said spindle within said outer sleeve when said threaded means is rotated, the improved rotation-preventing means which comprises a pin carried by said spindle and projecting radially outward therefrom inside said outer sleeve, a guide member inside said outer sleeve defining a channel extending lengthwise of said spindle and in which said pin is slidable, and adjustable fastening means for retaining said guide in a plurality of different angular positions relative to the axis of said spindle.

3,877,150

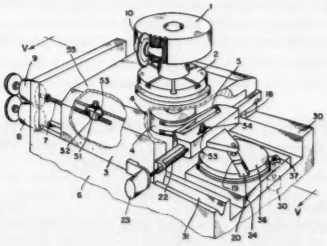
GEAR GENERATING MACHINE FOR MAKING AND TESTING INVOLUTE GEARS

Willy Höfler, 35, Fridtjof-Nansen-Strasse, Karlsruhe, Germany

Continuation of Ser. No. 118,683, Feb. 25, 1971, abandoned. This application Oct. 18, 1973, Ser. No. 407,481

Int. Cl. G01b *5/20;* **B23b** *5/02*

U.S. Cl. 33—179.5 D **9 Claims**



1. In a machine for operating on involute spur gears and helical gears wherein a workpiece performs a rolling-off motion relative to a tool, which rolling-off motion is composed of

a component of a purely rotatory motion and a component of a purely rectilinear movement, said machine comprising a machine stand, a machine table mounted on said stand for rectilinear movement relative to a tool carrier, drive means for moving said machine table rectilinearly, and a workpiece support rotatable on said machine table about an axis perpendicular to the direction of such rectilinear movement and being rectilinearly movable therewith, means for producing said purely rotatory motion comprising:

a. a guide way, means mounting said guide way on said machine stand for angular adjustment of its direction relative to the direction of the rectilinear table movement,

b. mechanical means slidably mounted on said machine table, said mechanical means slidably engaging said guide way so as to be displaced laterally thereby when said table is moved along its rectilinear path, and

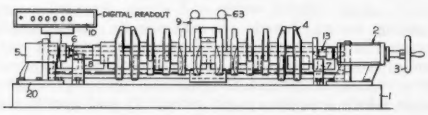
c. means mechanically interconnecting said mechanical means and said workpiece support for deriving from said lateral movement of said mechanical means said rotatory motion of said workpiece support.

3,877,151

METHOD OF CHECKING HORIZONTAL SPACINGS ON A CRANKSHAFT

George W. Roberts, Markham, Ill., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Oct. 15, 1973, Ser. No. 406,659
Int. Cl. B23q *17/02;* **B24b** *5/42;* **B23b** *5/18*
U.S. Cl. 33—180 B **5 Claims**



1. The method of measuring axial dimensions on a crankshaft having a centering recess of a predetermined taper in each end of the crankshaft with at least one of said recesses having a predetermined axial position relative to an established point in the crankshaft, and crankshaft supporting structure having supporting cones of a complementary taper for supporting the crankshaft on its axis comprising the steps, aligning the axis of a crankshaft co-incidental with the axis of the crankshaft supporting structure, establishing a reference surface on the supporting structure a predetermined axial dimension from said established point on the crankshaft by firmly seating the supporting cones in the crankshaft recesses, providing a measuring device with a digital readout having a probe for measurement on an axis parallel with said crankshaft axis, pre-setting zero of the measuring device at the reference surface of the supporting structure, axially measuring bearing surfaces and establishing bearing positions on the crankshaft at predetermined dimensions from the references surface to thereby provide an aligning and measuring method for a crankshaft and to assure accuracy of subsequent machining operations.

3,877,152

SANITIZING AND DEODORIZING APPARATUS

Dewitt Y. Gorman, P.O. Box 26323, Houston, Tex. 77032

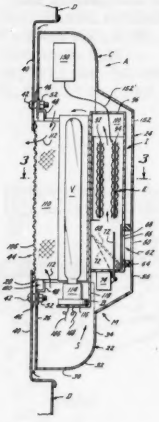
Filed Oct. 3, 1973, Ser. No. 403,287
Int. Cl. F26b *13/10*
U.S. Cl. 34—43 **12 Claims**

1. An apparatus for mounting with a movable door of an appliance to modify the appliance to provide sanitizing and deodorizing of the contents of the appliance, comprising:

a. ultraviolet source means for irradiating the contents of the appliance with radiant energy to sanitize and deodorize such contents; and

b. a cover plate forming a chamber for receiving the ultraviolet light source means therein; and

c. a supporting bracket mounted in said cover plate for mounting said ultraviolet source means in said cover plate; and



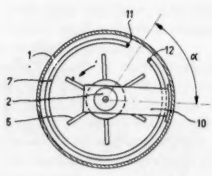
said cover plate having an inlet therein and a filter screen at an outlet adjacent said ultraviolet source means for passage of air into the appliance so that ozone may be formed in the air which passes into the appliance to sanitize and deodorize the contents of the appliance.

3,877,153

HAIR DRYING HOOD

Keimpe Klaas Keimpema, Zoetermeer, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 26, 1974, Ser. No. 445,993
Claims priority, application Netherlands, Mar. 21, 1973, 7303929
Int. Cl. A45d *20/24*
U.S. Cl. 34—99 **3 Claims**



1. In a hair drying hood operable with a source of electric current and including a hood formed generally a cylindrical wall with air inlet and outlet ends and defining a space with a central area, a radial-flow fan, an electric motor coupled to said fan for supporting and rotating same, and an arm supporting said motor in said central area, the arm extending generally radially outward and secured to said wall, wherein air from said air inlet that enters the fan generally axially at any circumferential entering location is expelled by said fan generally radially at a circumferential location α degrees of rotation in the direction of fan rotation, relative to said entering location, and wherein said arm is situated intermediate said air inlet end and said fan and impedes airflow therebetween thus creating an area of poor air circulation at a location at α degrees in the direction of fan rotation relative to the location of said arm, the improvement in combination therewith of an electric heating element formed as a partial circular arc and

situated radially outward of and adjacent said fan, said heating element having two ends connectible to said current source, said ends being situated at said area of poor air circulation.

3,877,154

EDUCATIONAL DEVICE

Charles J. Puglisi, Jr., Hyattsville, Md., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 29, 1974, Ser. No. 456,106
Int. Cl. G09b *1/14*
U.S. Cl. 35—8 R 9 Claims

1. An educational device for instructing directional motion comprising:

a. a stationary horizontal elevated support means consisting of coincidently placed substantially rigid members being spaced from one another so as to form a sandwich structure;

b. spacing means disposed between the substantially rigid members;

c. clamping means disposed about the rigid members to hold the sandwich together;

d. a first suspension means being supported about the spacing means in the sandwich support in such a manner to allow horizontal motion of the suspending means across the support; and

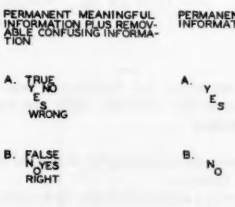
e. a second suspension means being perpendicularly supported by and in movable relationship with the first suspension means and being disposed as to allow independent vertical motion relative to the horizontal motion of the first suspension means.

3,877,155

RESPONSIVE ANSWER SYSTEM

Stephen F. Royka, Fairport, and Robert G. Martin, Rochester, both of N.Y., assignors to Xerox Corporation, Rochester, N.Y.

Filed June 26, 1967, Ser. No. 648,701
Int. Cl. G09b *3/02*
U.S. Cl. 35—9 R 8 Claims


PERMANENT MEANINGFUL INFORMATION PLUS REMOVABLE CONFUSING INFORMATION
PERMANENT MEANINGFUL INFORMATION
A. TRUE NO YES WRONG
A. YES
B. FALSE YES NO RIGHT
B. NO

1. A device for selectively indicating information comprising

a support having response areas for presenting information for selection,

permanent printing indicative of meaningful information permanently fixed to said support within a response area, and

removable printing indicative of confusing information removably fixed to said support within a response area,

said meaningful and confusing information being substantially legible even when said permanent and removable printing are fixed over one another on said support,

said permanent and removable printing being substantially similar such that an observer cannot determine which information is permanent and which is removable

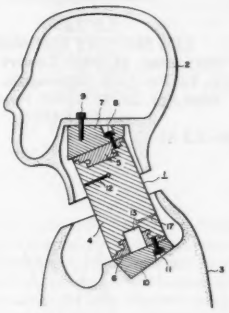
whereby the information within a response area is selected by attempting to remove the printing therein with the failure to remove printing identifying meaningful information.

3,877,156

NECK COMPONENT IN ANTHROPOMORPHIC TEST DUMMY

Kazu Itoh, 14-30, Sakuragaoka 4-chome, Setagaya-ku, Tokyo-to, Japan

Filed Apr. 29, 1974, Ser. No. 465,019
Claims priority, application Japan, Mar. 2, 1974, 49-24772
Int. Cl. G09b *23/32*
U.S. Cl. 35—17 8 Claims



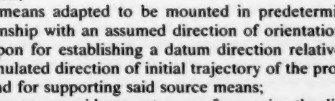
1. In an anthropomorphic test dummy having a head component and an upper thorax component, the combination therewith of a neck component comprising a neck main structure made of a resilient material with inherent hysteresis damping characteristic and connected at a superior end thereof to the head component and at an inferior end thereof to the upper thorax component, the neck main structure having in an anterior part thereof a slit whereby the neck component in flexion and extension deformations due to impact accelerations closely simulates the human neck.

3,877,157

WEAPON TRAINING SYSTEMS

David William Ashford; Sydney Stuart Hartley, both of Farnborough, and Bruce John Pike, Church Crookham, all of England, assignors to The Solartron Electronic Group Limited, Farnborough, England

Filed Aug. 8, 1973, Ser. No. 386,659
Claims priority, application United Kingdom, Aug. 18, 1972, 38760/72
Int. Cl. G09b *9/00*
U.S. Cl. 35—25 16 Claims



1. Equipment for use in a system for simulating the firing of a projectile from a weapon in a trajectory at a target comprising in combination:

source means for producing a beam of electromagnetic radiation;

support means adapted to be mounted in predetermined relationship with an assumed direction of orientation of a weapon for establishing a datum direction relative to the simulated direction of initial trajectory of the projectile, and for supporting said source means;

steering means on said support means for varying the direction in which said beam is directed relative to said datum direction;

scan controlling means for causing said steering means to vary the direction of said beam separately in two substan-

tially orthogonal planes and for providing signals representative of the direction in which the beam is directed; detecting means for detecting when the beam is incident on the target; and

discriminator means responsive to signals representative of the direction in which the beam is directed when the detecting means detects that the beam is incident on the target for providing signals representative of the direction of the target in relation to the datum direction.

3,877,158

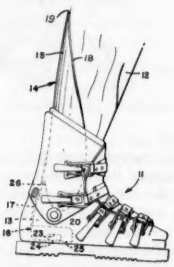
LEG SUPPORT FOR SKIERS

Blaine R. McCutchan, II, 4550 Central Ave. N.E., Hilltop Trailer Ct., Lot No. 1259, Minneapolis, Minn. 55421

Filed Apr. 29, 1974, Ser. No. 465,063

Int. Cl. A43b

U.S. Cl. 36—2.5 AL **9 Claims**



1. An accessory for use inside the boots of a skier for rearwardly bracing the skier's legs, comprising:

a. an elongated concave leg portion of predetermined length chosen to extend upwardly from approximately the user's upper ankle to the calf, the leg portion being essentially concave over its length and flexibly constructed to generally conform to a substantial portion of the back side of the user's calf and upper ankle;

b. a heel portion extending generally transversely forward of the elongated leg portion and configured to receive the user's heel and be held in place within the user's boot thereby;

c. and means connecting the leg portion to the heel portion so as to permit rearward to forward flexing movement of the leg portion relative to the heel portion while essentially precluding upward and downward movement of the leg portion relative to the heel portion.

3,877,159

ROTARY DISK CUTTER FOR A CUTTER DREDGE

Gijsbertus Jan Willem Boomstra, 12 Mijendelseweg, Wassenaar, Netherlands

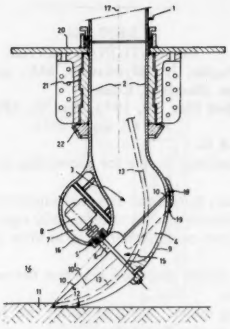
Filed June 20, 1973, Ser. No. 371,926

Claims priority, application Netherlands, June 30, 1972, 7209255

Int. Cl. E02f *3/92*

U.S. Cl. 37—64 **5 Claims**

1. In a cutter dredge, the combination of a ladder, a suction tube supported by said ladder and having an end portion which is turnable about its own axis, a dished disk cutter mounted for rotation at the free end of the end portion of said suction tube with the disk surface in an inclined position with respect to the axis of said end portion and with the concave side of the disk cutter facing said free end, and motor means housed in said end portion and connected to rotate said disk cutter about its axis, the shape of said end portion being such that, proceeding in the direction towards it free end from its other end, it is first widened so that it is closely adjacent to the high side of the inclined disk surface and then re-entrantly



curved above the low side of the inclined surface to form a restricted suction mouth.

3,877,160

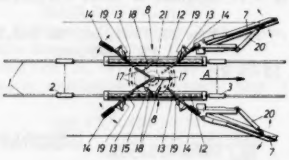
MOBILE APPARATUS FOR DISTRIBUTING AND SHAPING THE BALLAST OF A RAILROAD BED

Franz Plasser, and Josef Theurer, both of Johannesgasse 3, A-1010 Vienna, Austria

Continuation of Ser. No. 252,414, May 11, 1972, abandoned. This application Jan. 11, 1974, Ser. No. 432,669

Int. Cl. E01b *27/04*

U.S. Cl. 37—104 **7 Claims**



1. A mobile apparatus for distributing and shaping the ballast of a railroad bed whereon there are supported two track rails, comprising

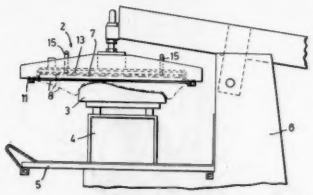
1. a frame,
2. two undercarriages mounting the frame on the track rails for mobility thereon,
3. two ballast plows mounted on the underside of the frame between the undercarriages,
   a. each plow being associated with a respective one of the track rails and comprising
   b. two transverse plates spaced apart in the direction of the associated track rail,
   c. the two transverse plates of each plow extending obliquely to the associated rail,
   d. opposite ones of the transverse plates of the two plows extending in common planes,
   e. the planes wherein the opposite transverse plates of the plows extend intersecting in a vertical line of intersection intermediate the two track rails, and
   f. the transverse plates defining a transverse space therebetween extending longitudinally of the track rails,
4. an intermediate ballast guiding part comprising a plurality of ballast guiding plates pivotal about the vertical line of intersection, and
5. means for pivoting the ballast guiding plates to close the transverse space between selected ones of the transverse plates of the plows.

3,877,161

APPARATUS FOR PRESSING ARTICLES OF CLOTHING

Wilhelm Engelbart, Seelscheid-Nackhausen, Germany, assignor to Hoffman Rheem Maschinen GmbH, Cologne, Germany

Filed July 23, 1974, Ser. No. 491,049
Int. Cl. D06f 71/00
U.S. Cl. 38—17 8 Claims



1. Apparatus for pressing contoured articles of clothing such as jackets, coats, costumes and the like comprising a contoured former for receiving an article to be pressed and a cooperating pressing unit for pressing an article against said former, said pressing unit including a pressing plate in the form of a hollow body having a cavity opening towards said former, an impervious elastic membrane closing said hollow body and sealed to said hollow body, the relative proportions of said former and said membrane being such that said membrane is engageable with all surfaces including side surfaces of said former generally opposing said membrane, said pressing plate having an inner surface, means for heating said inner surface, means for applying a vacuum within said pressing plate for drawing said membrane into contact with said inner surface for first heating said membrane, and means for applying a pressure within said pressing plate for pressing said membrane against an article on said former.

3,877,162

MEDALLION DISPLAY

Richard B. Wilson, 630 S. Rosemead, Pasadena, Calif. 91107

Filed Jan. 21, 1974, Ser. No. 434,962
Int. Cl. G09f 3/18
U.S. Cl. 40—10 D 2 Claims

1. A display device for a three-dimensional object such as a medallion or the like comprising a body of transparent material having front and back surfaces, the back surface having a bore extending into the body, the bore forming a recessed flat surface, the recessed surface being smooth to prevent light scattering, the body being in the form of a block with front and back surfaces that are flat and parallel to each other, the body having edge surfaces extending between the front and back surfaces, means forming an opaque covering of the edge surfaces, an opaque backing member extending across the back surface and closing off the bore, a spacer secured to the backing member and projecting into the bore to hold the medallion in place against the recessed surface, the spacer being substantially smaller than the bore so as to be out of contact with the body of transparent material.

3,877,163

IDENTIFICATION BRACKET

Claude Bissonet, 3747 Coronet Rd., Apt. 10, Montreal 247, Quebec, Canada

Filed Dec. 17, 1973, Ser. No. 425,629
Int. Cl. G90f 3/18
U.S. Cl. 40—16.4 8 Claims

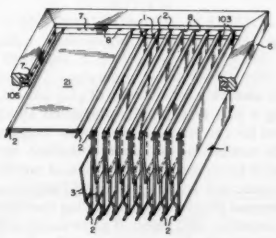
1. An identification bracket comprising a display plate, of generally rectangular shape, having top and bottom surfaces each with longitudinal edges, and a front and back face, both said front and back faces having top and bottom longitudinally extending mutually facing channels disposed along the top and bottom longitudinal edges of said front and back faces, respectively, for slidably and frictionally receiving plates to mount thereon letters to compose a person's name and other information, hinge means along the central portion of the bottom surface of said display plate, a U-shaped clamp member having a web and two parallel legs, said hinge means being connected to one of said legs on the outside face thereof, said hinge means having a hinge axis parallel to said bottom longitudinal edge of said display plate, and a clamping screw threadedly received in a threaded hole of one of said legs to clamp said display plate to the marginal portion of a desk top or the like with said display plate pivotable about said hinge means, to take a desired pivotal position.

3,877,164

DEVICE FOR MAKING LISTS BY COPYING PORTIONS OF DOCUMENTS IN AN INTEGRATED FORM

Junichi Yokoi, II-20, 2-chome, Wakaehonmachi, Higashi-Osaka, Japan

Filed Sept. 4, 1973, Ser. No. 393,740
Claims priority, application Japan, Aug. 6, 1972, 47-89864
Int. Cl. B42f 15/00
U.S. Cl. 40—104.04 10 Claims



1. A device for making lists by copying portions, such as index areas (5), of oblong documents (4) in an integrated form, comprising, in combination, replaceable oblong holders (1, 1') somewhat larger than the documents to be accommodated, said holders having tongues (3, 3') at one of the longer edges thereof and sub-tongues (103, 103') at the opposite longer edges, on the sides of said holders opposite to those having said tongues thereon, for receiving therebetween the

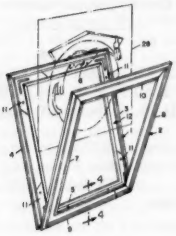
documents of which the index areas are to be copied, said tongues and said sub-tongues having substantially the same lengths as said holders, lengthwise upper and lower wires (2) attached to portions of said holders along said longer edges, said wires being substantially parallel with each other and with said tongues and said sub-tongues, a two-part actuating frame including an upper (6) and a lower (6') frame portion, each having two pairs of parallel sides and a plurality of opposed recesses (8) in all sides, for receiving therein respective groups of said upper and said lower wires to mount said holders in any desired spaced-apart relation between said frame portions, a base plate (9, 9') disposed in facing relationship with said upper frame portion, said lower frame portion being fixed to said base plate, parallel-motion link means (10) pivotally connected to said frame portions, and stop means (11) for said link means, so that said upper frame portion may be raised and folded down onto said lower frame portion in a continuous parallel relationship, for the purpose of manually inserting, copying and removing the documents, wherein the respective recesses of said frame portions allow selectively to expose a wide range of widths of the index areas of the documents when said upper frame portion is folded down onto said lower frame portion for copying the index areas, and also selectively to insert said holders in the longitudinal and the transversal directions.

3,877,165

FRAME ASSEMBLY

Edward B. Lumbard, Chicago, Ill., assignor to Poster Products, Inc., Chicago, Ill.

Filed May 10, 1973, Ser. No. 359,201
Int. Cl. G09f 1/12
U.S. Cl. 40—152 **7 Claims**



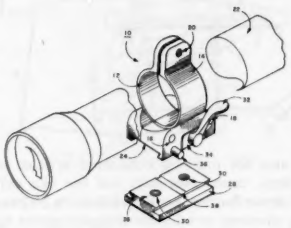
1. A frame assembly for carrying display panels, said assembly including a pair of generally polygonal allochiral frames having means for carrying a display panel between them, said frames each comprising an upper member, opposing side members and a lower member, each of said members containing an inner side and an outer side, said members each containing an internal groove with an opening therein on the inner side of said member, said internal grooves on said inner sides of said members facing one another, and a mechanical connecting member having an intermediate portion and opposing ends shaped to fit said internal grooves and inserted in said grooves of two adjacent opposing members with said intermediate portion extending through said openings to connect said frames so as to permit pivoting of said frames around said connecting member to open and closed positions with respect to one another while retaining them in a predetermined relationship with one another and in contact with one another adjacent said connecting member when in said open position.

3,877,166

GUNSIGHT MOUNT WITH SPRING BIASED JAW

William A. Ward, 35 S. Arcadia Rd., Hackensack, N.J. 07601

Filed Jan. 14, 1974, Ser. No. 433,124
Int. Cl. F41g 1/38
U.S. Cl. 42—1 S **2 Claims**



1. A gunsight mount mountable on a gun barrel comprising in combination:

a. a first support member having a dove tail shaped recess;
b. a second support member;
c. a dovetail shaped projection extending from said second member communicating with said recess;
d. a moveable jaw slidably mounted in said first support member to slide in a direction transverse to said recess for engaging said projection, said jaw and said first support member having mutually facing walls each of said walls having two opposed spring receiving wells;
e. a pair of compression springs one each disposed in said spring receiving wells for biasing said jaw away from said projection;
f. finger activated cam means mounted on said first member in connection with said jaw for biasing said jaw against said projection to secure said first and second members;
g. means for supporting a gun sight on one of said members; and
h. means for attaching the other of said members to a gun barrel.

3,877,167

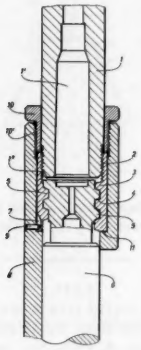
DEVICE FOR MOUNTING A GUN BARREL ON A FIREARM

Dieter Keppeler, Ulm/Danube, Germany, assignor to Carl Walther Sportwaffenfabrik, Ulm/Danube, Germany

Filed Nov. 16, 1972, Ser. No. 307,014
Claims priority, application Germany, Nov. 19, 1971, 2157420
Int. Cl. F41c 21/00
U.S. Cl. 42—75 B **2 Claims**

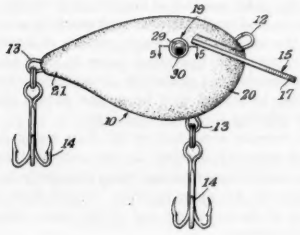
1. In a firearm and particularly repeating guns, the combination of a gun barrel having a locking bushing threaded on its rearward end and axially adjustable thereon, and a second threaded bushing on said barrel threadedly engageable with a breech casing and in abutting engagement with the forward end of said locking bushing when the rear end of the barrel is inserted into said breech casing to removably secure the gun barrel within the breech casing, a breech block secured within said breech casing, said locking bushing being secured on the rear end of the barrel in a position corresponding to a predetermined standard distance between the rear end of the barrel

and the forward end of said breech block so that the gun barrel is exchangeable or replaceable by a same or different



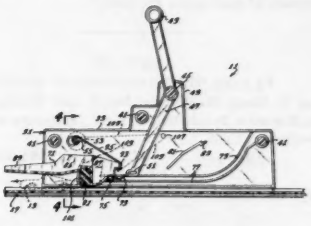
caliber barrel in the same firearm without any change in the relationship between the gun barrel and breech.

3,877,168
FISH LURE
Milton J. Stevens, 3454 Ocean View Blvd., Glendale, Calif. 91208
Filed July 26, 1974, Ser. No. 492,220
Int. Cl. A01k *85/00*
U.S. Cl. 43—42.31 **7 Claims**



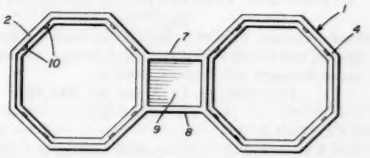
1. A fish lure comprising:
A buoyant, generally solid polystyrene body;
sound producing means disposed within the body;
a relatively thin metallic member having one end affixed to the body and its opposite end extending forwardly therefrom; and
two eye-simulating means embedded, one on each side of the body, each of said means comprising a transparent domed enclosure, and a loose ball enclosed in each respective enclosure and adapted to strike the interior surfaces of the dome to produce sounds during fishing-line controlled movements of the lure.

3,877,169
VEHICLE-TRIGGERED TOY VEHICLE ACCELERATOR
James F. Munday, Southgate; John W. Ryan, Los Angeles; Conrad B. Sloop, Huntington Beach, and William R. Baynes, Palos Verdes Peninsula, all of Calif., assignors to Mattel, Inc., Hawthorne, Calif.
Filed Jan. 23, 1970, Ser. No. 5,329
Int. Cl. A63h *18/02*
U.S. Cl. 46—1 K **6 Claims**



1. Apparatus for motivating unpowered toy vehicles along a roadway, comprising:
a housing positioned over and attached to a roadway section of said roadway, said housing including a cam track defining a predetermined path and an adjustable tension control arrangement;
a vehicle accelerating assembly movably disposed in said housing, said assembly including a guide pin located in said cam track and a triggering mechanism in the path of vehicle travel along said roadway;
motivation means including a cocking arm and an attached biasing-force-producing resilient member both coupled to said vehicle accelerating assembly, the manual operation of said cocking arm moving said assembly along said predetermined path against said biasing force for rapidly moving said assembly over a predetermined path to engage and push the toy vehicles when the vehicles actuate said triggering mechanism, said biasing-force-producing resilient member being connected to said adjustable tension control arrangement for varying said biasing force; and
starting means including a resilient member attached to said housing adjacent the vehicle entrance to said apparatus and a push bar attached to the resilient member for pushing the toy vehicles along said roadway section and into contact with said triggering mechanism.

3,877,170
CONSTRUCTION TOY ELEMENT
Johannes Bakker, Beatrijspad, 23, Amersfoort, Netherlands
Filed Oct. 4, 1973, Ser. No. 403,666
Claims priority, application Netherlands, Mar. 30, 1973, 7304435
Int. Cl. A63h *33/08*
U.S. Cl. 46—23 **10 Claims**



10. A toy element comprising at least two cup-like parts, each of said parts having a lower portion and an upper portion, said lower and upper portions having complementary

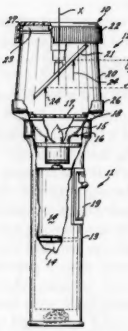
external and internal cross-sectional shapes, respectively, for removable frictionally resisted telescoping engagement of said lower portion into the upper portion of an identical toy element, said upper portions each being of an interior height greater than the exterior height of each lower portion, said cup-like parts being disposed in side-by-side spaced apart relation, and connecting structure formed integrally with and extending between adjacent sides of said upper portions, said connecting structure establishing a spacing between adjacent sides of said lower portions greater than the sum of the wall thicknesses of said upper portions.

3,877,171

FLASHLIGHT AMUSEMENT DEVICE

Conrad B. Sloop, Huntington Beach, and Wanda L. Clearwaters, Hermosa Beach, both of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed July 23, 1973, Ser. No. 381,830
Int. Cl. A63h *33/26*
U.S. Cl. 46—228 **8 Claims**



1. An amusement device comprising:
a light source emanating a beam of light; and
reflecting means rotatably mounted on the longitudinal axis of said light source and within the path of said beam of light for providing a rotating beam of light, said reflecting means including an eccentrically mounted weight member to ensure rotation of said reflecting means upon movement of said light source.

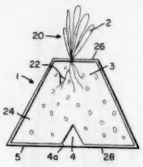
3,877,172

FOAMED PLASTIC PROFILE MEMBER FOR HYDROPONIC CULTIVATION AND GROWTH OF PLANTS

Johann Schwab; Friedrich Bohm; Gerlinde Ruthner; Kurt Buchel, and Georg Widtmann, all of Vienna, Austria, assignors to Semperit AG, Vienna, Austria

Filed Feb. 26, 1973, Ser. No. 335,463
Int. Cl. A01g *31/00*
U.S. Cl. 47—1.2 **15 Claims**

1. A foamed plastic body member serving as a carrier substance for the root space during the hydroponic cultivation and growth of plants, comprising an elongated porous body member being formed of one piece and, viewed in cross-section, being provided at its edge with at least one recess extending the length of said body member forming a continuous channel which extends into said body for continuously feeding nutrients to said body, a diaphragm bounding the



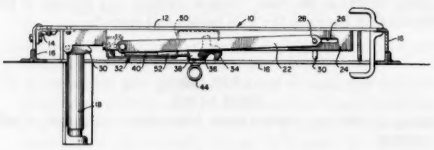
recess at a side facing away from the body member wherein a hollow space is formed by the recess and the diaphragm.

3,877,173

EMERGENCY LATCH FOR A HATCH STRUCTURE

Robert J. Lyons, 1060 Ridge Rd., Hamden, Conn. 06514

Filed Apr. 8, 1974, Ser. No. 458,586
Int. Cl. E05f *15/20*
U.S. Cl. 49—7 **5 Claims**

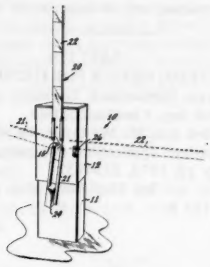


1. In a hatch structure comprising a frame and a door hung in said frame to close by gravity, operating means facilitating the manual movement of the door between open and closed positions relative to said frame and comprising a brace hinged to the frame, a track member mounted on said door, and slide means at the unhinged end of said brace confined for sliding movement in said track member with opening and closing of the door, the improvement which consists of latching means for coacting with said operating means to latch said brace in door-open position but releasable automatically upon occurrence of fire to release said brace and permit said door to close, said latching means comprising:
a catch member mounted on the door and a cooperating keeper member secured to the unhinged end of said brace, said keeper member being engagable by said catch member in the open position of said door to prevent sliding of the unhinged end of the brace relative to the track member;
a carrier member movably mounted in said latching means; said catch member being pivotally mounted on said carrier member for movement toward and away from latching position relative to said keeper, said carrier member being independently movable in said latching means between latching position wherein said catch can engage said keeper and disabled position wherein it cannot, means releasably retaining said carrier member in position to enable said catch to engage said keeper, and spring means biasing said catch towards keeper-engaging position;
said retaining means for said carrier including severable linkage means holding said carrier in said latching position.

3,877,174
GRAVITY OPERATED ELECTROMAGNETICALLY CONTROLLED GATE

Robert R. McDonald, 6028 Moss Bank Dr., Palos Verdes Pennisula, Calif. 90274

Filed Mar. 18, 1974, Ser. No. 451,950
Int. Cl. E01f *13/00*; E05f *1/00*, *15/10*
U.S. Cl. 49—334 10 Claims



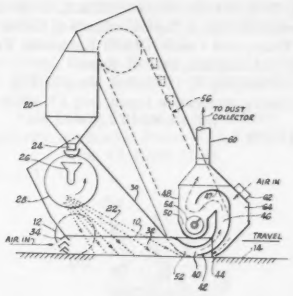
1. An electromechanically controlled, gravity operated gate assembly comprising:
- an enclosed housing containing an electromechanical assembly for effecting movement of a gate arm positioned externally of said housing,
- gear means contained within said housing and connected to a drive shaft which extends through said housing,
- a gate element mounted on the extending portion of said drive shaft,
- said gate element including a counterbalanced channel member affixed for movement with said drive shaft and a gate arm secured to said channel member,
- a motor and clutch assembly supported within said housing and connected to drive said gear means,
- a follower arm mounted within said housing for rotation with said shaft,
- electromagnetic means supported within said housing and cooperating with said follower arm to maintain said gate in a generally horizontal position,
- switch means supported within said housing and engageable by said follower arm to maintain said electromagnet energized while said gate arm is in said horizontal position,
- circuit control means operative in an energized state to activate said motor and clutch assembly for moving the gate arm from a vertical position to a horizontal position, said switch means being energized in response to contact by said follower arm to de-energize said motor and clutch assembly and to maintain said electromagnetic means energized to maintain said gate arm in said horizontal position, and
- said circuit control means in the de-energized state being operative to de-energize said switch means whereby said gate arm is moved to the vertical position by gravity.

3,877,175
MOBILE SURFACE TREATING APPARATUS

Clyde A. Snyder, Mishawaka, Ind., assignor to Wheelabrator-Frye Inc., New York, N.Y.

Filed May 24, 1973, Ser. No. 363,723
Int. Cl. B24c *3/06*
U.S. Cl. 51—9 M 11 Claims

1. In a mobile apparatus for surface treatment with particulate material, an enclosure having an open bottom side through which the surface to be treated is exposed, means mounting the enclosure for movement over the surface, projecting means within the enclosure for directing particulate material through the open bottom side onto the surface to be treated, sealing means extending between the bottom edges of the enclosure and the surface for restraining passage of particulate material from within the enclosure, means for removal of spent particulate material, dust and dirt from the surface, and separating means for separating reusable particulate material from the remainder of the material removed from the surface, the improvement wherein the means for removal of spent particulate material, dust and dirt from the surface comprises:

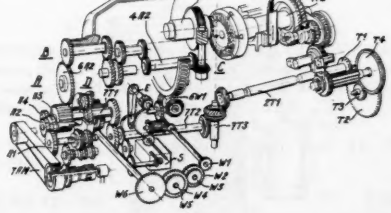


one or more suction nozzles extending crosswise along the rearward edge of the enclosure with the bottom wall of the nozzle spaced a short distance above the surface;
- a blower positioned to project an air stream in a forwardly direction through the space between the bottom wall of the nozzle and the surface whereby particulate material, dust and dirt remaining on the surface is swept forwardly by the air stream into a position to be exposed to the suction nozzle for removal; and
- means for cleaning and recycling a part of the suction air to the blower.

3,877,176
APPARATUS FOR GRINDING BEVEL- OR HYPERBOLOID-SHAPED GEARS

Erich Kotthaus, Kloten, Switzerland, assignor to Werkzeugmaschinenfabrik Oerlikan-Buhrle AG, Zurich, Switzerland

Division of Ser. No. 297,986, Oct. 16, 1972. This application Jan. 2, 1974, Ser. No. 429,519
Claims priority, application Switzerland, Oct. 21, 1971, 15375/71
Int. Cl. B24b *3/00*, *5/00*
U.S. Cl. 51—90 8 Claims



1. An apparatus for grinding bevel- or hyperboloid gears possessing concave tooth flanks and convex tooth flanks, comprising a grinding wheel, a plurality of grinding bodies provided on the grinding wheel, a first group of said plurality of grinding bodies serving for grinding the concave tooth flanks of the gear and the remaining group of said plurality of grinding bodies serving for grinding the convex tooth flanks of the gear, means for mounting said first group of grinding

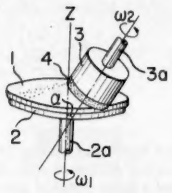
bodies to be rotatable about their own associated axis at an inner circle at the grinding wheel, means for mounting the remaining group of grinding bodies to be rotatable about their own associated axis at an outer circle at the grinding wheel, means for mounting the grinding wheel to be rotatable about an axis containing the center of each said inner and outer circles, and drive means for rotating said grinding bodies.

3,877,177

DEVICE FOR MACHINING SPHERICAL SURFACES

Tadasu Taniguchi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo and Canon Denshi Kabushiki Kaisha, Chichibu-shi, Saitama-ken, both of, Japan

Filed July 9, 1973, Ser. No. 377,256
Claims priority, application Japan, July 17, 1972, 47-71497
Int. Cl. B24b *13/00*
U.S. Cl. 51—131 **7 Claims**



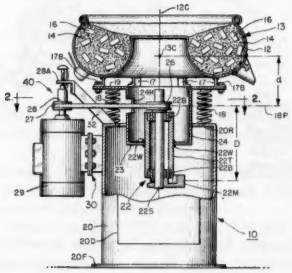
1. A device for machining a spherical surface on a workpiece comprising, workpiece holding means for rotatably holding the workpiece, workpiece rotating means for causing said workpiece to rotate normally in a predetermined direction at a preset rotational speed, tool holding means for rotatably holding a tool adapted to grind the workpiece, the rotating axis of said tool being inclined relative to the rotating axis of said workpiece, and tool rotating means for causing said tool to rotate in the same direction as that of said workpiece and at a rotational speed obtained by multiplying the inverse of the cosine of an angle formed by said inclination between said rotating axis of said workpiece and said rotating axis of the tool by the rotational speed of the workpiece.

3,877,178

VIBRATORY FINISHING MACHINE

Tony Campanelli, 243 Flora Pky., Addison, Ill. 60101

Continuation of Ser. No. 172,482, Aug. 17, 1971, abandoned. This application May 21, 1973, Ser. No. 362,392
Int. Cl. B24b *31/06*
U.S. Cl. 51—163 **10 Claims**



1. In a vibratory finishing machine of the type having a bowl into which a workload may be charged for being subject to continuous vibration, the bowl having a workload center, and which machine includes a base to which a sprung mass including at least the bowl, is resiliently supported such that a vibratory null point is defined a distance below the workload center, the improvement comprising:

a vibratory mechanism coupled to the bowl and comprising only a single rotatable eccentric mass or weight mounted for rotation about a point which center of rotation is located at a distance below the null point, which distance is greater than said distance between the workload center and the null point; and

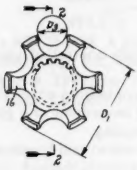
means for rotating said eccentric mass or weight.

3,877,179

WORK LOCATING DEVICE FOR GRINDING MACHINES

Ernst Hammann, Dietzenbach, Germany, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Jan. 25, 1974, Ser. No. 436,469
Claims priority, application Germany, Feb. 13, 1973, 7305282; July 10, 1973, 2334932
Int. Cl. B24b *49/02*
U.S. Cl. 51—165 R **4 Claims**



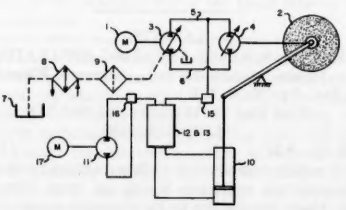
1. Apparatus for automatically aligning the center of a workpiece on the table of a grinding machine with the center of a grinding wheel mounted on the base of the machine where the workpieces to be ground are not identical as to size, comprising chuck means mounted on the table for holding the workpiece to be ground, a first gage means for measuring the size of a workpiece held in said chuck means, a second gage means for measuring the position of the table relative to the grinding wheel, means for comparing the measurements furnished by the two said gaging means and providing a difference signal in response to a variation in the size of the workpiece, and drive means controlled by said difference signal for adjusting the position of the table as necessary to reduce the signal to zero thereby centering the workpiece on said grinding wheel.

3,877,180

DRIVE SYSTEMS FOR A GRINDING WHEEL

James N. Brecker, Pittsburgh, Pa., assignor to Carnegie-Mellon University, Pittsburgh, Pa.

Filed Nov. 12, 1973, Ser. No. 414,651
Int. Cl. B24b *49/16*
U.S. Cl. 51—165.9 **6 Claims**



1. A system for driving a grinding wheel and urging it against a work piece which comprises:

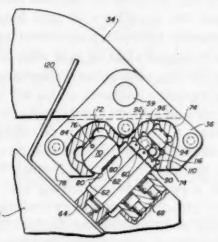
a. a first hydraulic means driving the grinding wheel and applying a torque to the grinding wheel, the first hydraulic means developes a dynamic pressure in fluid supply in the first hydraulic means which is used to transmit the torque to the grinding wheel; and

b. a second hydraulic means urges the grinding wheel into the work and is fluid coupled to the first hydraulic means, the second hydraulic means is continuously responsive to changes in the dynamic pressure of the fluid supply in the first hydraulic means and the pressure applied by the second hydraulic means, in urging the wheel against the work, continuously varies according to the dynamic pressure in the fluid supply in the first hydraulic means.

3,877,181
CLAMPING ASSEMBLY

Elman R. Dunn, Roscoe, Ill., assignor to Litton Industries, Inc., Beverly Hills, Calif.

Filed Feb. 6, 1974, Ser. No. 440,169
Int. Cl. B25b *1/04, 1/24*
U.S. Cl. 51—217 R **1 Claim**



1. A clamping assembly for clamping a workpiece stack having at least three rectanguloid workpieces in a V-block or the like comprising

a clamp arm

a clamp head pivotally secured to said clamp arm,

means for displacing said clamp arm from an unclamped position to a clamped position,

said clamp head including

a body portion

side plates adapted to be secured to opposing sides of said body portion,

a first body opening

a rear clamp pin adapted to be located within said first body opening,

means for mounting said rear clamp pin on said side plates for eccentric rotation and limited lengthwise tilting,

said rear clamp pin including bearing surface means for engaging the rear surface of the workpiece stack and being selectively configured to permit lengthwise tilting and limited eccentric rotation,

a second body opening,

three lower clamp pins,

means for mounting each of said three lower clamp pins on said side plates for eccentric rotation and limited lengthwise tilting,

each of said lower clamp pins including cylindrical end portions having bearing surface means for engaging the top surface of a corresponding workpiece of the workpiece stack,

a pair of center pins including cylindrical end portions having bearing surface means of selected width to permit engagement with the cylindrical end portions of an adjacent pair of lower clamp pins,

an upper pin including cylindrical end portions having bearing surface means of selected width to permit engagement with the cylindrical end portions of said pair of center pins and being selectively configured to permit limited lengthwise tilting,

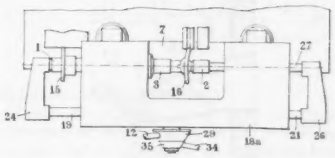
said second opening being selectively configured to receive said lower, center and upper pins,

whereby when the clamp assembly is closed upon a workpiece stack equal pressure will be applied to the engaged surfaces of the workpiece stack.

3,877,182
DEVICE FOR CLAMPING THE TEMPLET AND THE WORKPIECE IN AN OUTLINE REPRODUCTION MACHINE

Jean-Marie Godot, Brunoy, France, assignor to Essilor International (Compagnie Generale d'Optique), Joinville Le Pont, France

Filed Oct. 9, 1974, Ser. No. 513,381
Claims priority, application France, Oct. 9, 1973, 73.36001
Int. Cl. B24d *41/06*
U.S. Cl. 51—217 T **3 Claims**



1. A device for clamping a templet and a workpiece to be outlined, on the opposite ends, respectively, of a rotary spindle of an outline reproduction machine, comprising two clamping jaws each axially movable towards and away from a relevant end of said spindle, a spring for resiliently urging a first one of said jaws towards the adjacent end of said spindle, the other jaw in its rest position being somewhat spaced from the other end of said spindle, single control means operatively connected to said pair of clamping jaws for controlling the movements thereof, said control means moving said first jaw away from the adjacent end of said spindle against the return force of said spring without moving the other jaw when said control means are actuated in a first direction from a rest position, and moving said other jaw towards the adjacent end of said spindle and said first jaw towards the adjacent end of said spindle if said first jaw has not already been so moved by the action of said spring when said means are actuated in the direction opposite to said first direction, and locking means for holding said control means in the position in which they have been set after having been actuated in said opposite direction.

3,877,183
METHOD OF POLISHING SEMICONDUCTOR SURFACES

Helmut Deckert, and Herbert Jacob, both of Burghausen-Obb, Germany, assignors to Wacker-Chemie GmbH, Munich, Bavaria, Germany

Filed Aug. 28, 1972, Ser. No. 284,167
Claims priority, application Germany, Apr. 11, 1968, 1752163
Int. Cl. B24b *1/00*
U.S. Cl. 51—283 **1 Claim**

1. Process of finish polishing the surface of a semiconductor which comprises applying to said surface a polishing agent consisting essentially of a finely divided, freshly precipitated, difficultly soluble member of the group consisting of a metal silicate and a metal fluosilicate having a particle size range from about 20 to about 60 mμ, said metal silicate being precipitated from an aqueous solution of an alkali silicate by addition of a water soluble compound of a metal of the group consisting of zirconium, iron, lead, nickel, cobalt, magnesium,

calcium, strontium, barium, zinc and aluminum, and said metal fluosilicate being precipitated from an aqueous solution of fluosilicic acid or an alkali fluosilicate by addition of a water soluble compound of a metal of the group consisting of sodium, potassium, calcium, barium and aluminum, said freshly precipitated difficultly soluble metal silicate or fluosilicate being in suspension in the aqueous reaction medium in which it is formed by precipitation.

3,877,184

METHOD FOR WORKING FLEXIBLE CONTACT LENSES

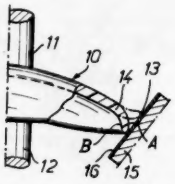
Pierre Billault, Bry-Sur-Marne, and Gerard Gomond, Paris, both of France, assignors to Essilor International (Compagnie Generale d'Optique), Joinville-le-Pont, France

Filed May 10, 1973, Ser. No. 358,908

Claims priority, application France, May 18, 1972, 72.17783

Int. Cl. B24b *1/00, 9/14*

U.S. Cl. 51—284 **3 Claims**



1. A method of working the peripheral portion of a flexible contact lens, comprising gripping a flexible contact lens blank between a pair of rotary spindles, rotating the spindles, bringing a working surface into contact with the lens blank until there is deformation of the peripheral portion of the lens blank, the opposed faces of the peripheral portion of the lens blank thereby being alternately worked.

3,877,185

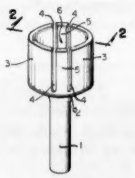
ABRADING TOOL

Edmund F. Wells, R.D. No. 2, Box 113, Fox Hollow Rd., Hoosick Falls, N.Y. 12090

Filed June 3, 1974, Ser. No. 476,120

Int. Cl. B24d *17/00*

U.S. Cl. 51—358 **7 Claims**



1. An abrading tool comprising:

means adapted for receiving a rotating drive input;

a body member attached to said drive receiving means, said body member having a surface oriented transverse to the axis of rotation of said drive receiving means;

a plurality of wall portions upstanding from said transverse surface and defining a bore concentric with said axis of rotation of said drive receiving means, said wall portions being spaced one from the other around the bore; and

at least one strip of abrasive sheet material threaded among said spaced wall portions around said bore, to define an essentially cylindrical abrading surface.

3,877,186

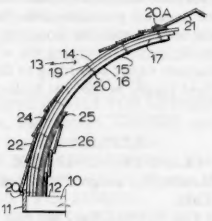
BUILDING STRUCTURE

Thomas H. Cartier, 145 Owen Street, Barrie, Ontario, Canada

Filed Nov. 26, 1973, Ser. No. 418,891

Int. Cl. E04b *7/10*

U.S. Cl. 52—82 **2 Claims**



1. A building structure comprising in combination a circular base, a plurality of ribs secured by one end thereof in spaced relationship around the periphery of said base and curving upwardly and inwardly towards a common apex, a sealing cone secured to the upper ends of said ribs, and an exterior cover secured to said ribs, said cover comprising a plurality of substantially rectangular elongated strips of board secured transversely around said ribs in overlapping relationship one row with the other and sealing strips covering the abutting ends of adjacent lengths of board, said sealing strips comprising a substantially rectangular piece of metal stripping counter angulated to form a pocket for receiving said abutting ends and having a lower attaching portion extending therefrom for attaching said strips to an associated rib on the underside of said abutting ends, and an upper attaching portion extending therefrom for attaching to the same rib but spaced above said lower attaching portion, said pocket enclosing said abutting ends of said boards, said upper attaching portion being angulated downwardly at the upper edges of said abutting ends and then being angulated to lie substantially parallel to and in contact with said rib and underneath the length of board immediately above said abutting ends and which overlies said upper portion of said abutting ends.

3,877,187

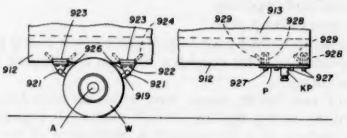
DWELLING CONSTRUCTION SYSTEM

Johnston R. Livingston, Denver, Colo., assignor to Marcor Housing Systems, Incorporated, Denver, Colo.

Division of Ser. No. 230,803, March 1, 1972, Pat. No. 3,800,493, which is a continuation-in-part of Ser. No. 166,545, July 27, 1971, abandoned. This application May 18, 1973, Ser. No. 361,821

Int. Cl. B60b *3/32*

U.S. Cl. 52—143 **6 Claims**



1. A mobile home comprising:

an elongated prestressed concrete pallet including a substantially planar deck and a plurality of reinforced, longitudinally extending tensioned beams depending from the deck, said beams being adapted for support only at or near one or more longitudinally spaced optimum load support points on said beams,

an enclosure formed on the deck of the pallet including load bearing walls extending a predetermined distance above the deck to support an overhead structure;

at least one pair of ground engaging wheels mounted on the under surface of the beams substantially at one or more of said optimum load support points; and

connecting means for attaching said pallet to a towing vehicle.

3,877,188

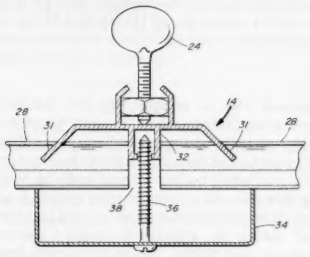
HORIZONTAL PANEL SKIRTING FOR BELOW DWELLING

Francis L. Struben, Whitehall, Md., assignor to Silver-Top Manufacturing Company, Inc., White Marsh, Md.

Continuation of Ser. No. 223,245, Feb. 3, 1972, abandoned. This application Oct. 10, 1973, Ser. No. 404,930

Int. Cl. E04g *9/06, 11/00*

U.S. Cl. 52—169 **7 Claims**



1. A panel skirting for enclosing the space below an elevated dwelling disposed on a base, comprising:

a plurality of spaced vertically disposed posts, each said post having spaced pairs of slots formed along its opposite edges, one slot of each pair of slots being angled upwardly and the other slot of each pair of slots being angled downwardly;

a plurality of panel members disposed horizontally to said posts and being disposed on a forward side of the posts, each panel member having horizontal edges engaging in said slots of each pair of slots, horizontally adjacent panel members being held in alignment and the ends thereof being held spaced apart by said posts;

a longitudinal channel on each of the posts on the forward side of the post common with and located between the spaced ends of the horizontally adjacent panel members supported in the slots in each of said posts, the longitudinal channel on each of the posts having a vertically disposed longitudinal aperture disposed in the forward surface thereof which faces outwardly normal to the plane in which the panel members substantially lie, the longitudinal aperture extending the length of the longitudinal channel and communicating the interior of the channel to ambient;

means mounted on the top of each post and attaching into at least two spaced loci on the underside of the dwelling; fastening means on said last-mentioned means and fastening said lastmentioned means and said post to the dwelling;

a trim strip positioned over the seam formed by the spaced edges of said horizontally adjacent panel members, the trim strip substantially comprising a U-shaped member invertedly positioned over the seam to cover said seam; and,

securing means inserted through the outwardly facing surface of each said trim strip and extending through the longitudinal aperture and into the longitudinal channel, the securing means engaging the walls of the channel defining the aperture to secure the trim strip to the post, thereby to cover the seam between said panel members and to hold the panel members in place between the trim strip and the posts.

3,877,189

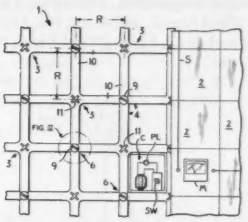
LATTICE ASSEMBLY, E.G. FOR MOSAIC TILES, ELECTRICAL CIRCUIT ELEMENTS AND DISPLAY SYSTEMS

Helmut Mauell, Ansembourgalle 23, 5604 Neviges, Germany

Filed Oct. 9, 1973, Ser. No. 404,745

Int. Cl. H02b *1/04*

U.S. Cl. 52—475 **7 Claims**



1. A lattice assembly comprising:

a plurality of generally planar rigid cell-forming lattice elements each having a connection portion formed with at least one arc-segmental tab projecting laterally from the plane of the respective element, said connection portions meeting at corners of the cells;

a plurality of anchors at said corners and each formed with a threaded hole having a counterbore, said tabs at each corner being engaged in the respective counterbore; and a plurality of fastener bolts each having a threaded shank received in said hole and a head engaging and overlying the respective connection portions of the elements having tabs in the respective counterbore to clamp said respective connection portions against said anchor, said tabs lying between a surface of said shank and a wall of the respective counterbore.

3,877,190

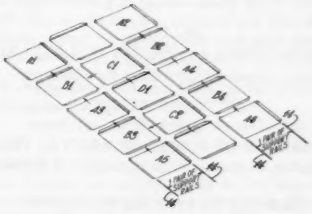
SUPPORTING SYSTEM FOR FLANGED CEILING TILES

Neal A. Corcoran, Jr., Columbus, Ohio, assignor to Owens-Corning Fiberglas Corporation

Filed Feb. 13, 1973, Ser. No. 331,746

Int. Cl. E04b *1/86, 5/60*

U.S. Cl. 52—484 **5 Claims**



1. A method of supporting ceiling tiles from an overhead structure, which ceiling tiles have outwardly-extending flanges on opposite edges and recesses extending between the flanges along the two other opposite edges, said method comprising positioning a first one of the tiles with the flanges supported on two horizontally-extending flanges of two elongate supporting members, inserting one of the flanges of a second tile in one of the recesses of the first tile, supporting a third one of the tiles with its flanges on another two horizontally-

extending flanges of the two supporting members with the third tile being in the same plane as the first tile and spaced from the second tile, positioning the second tile in the same plane as the first and third tiles, and moving the third tile into contiguous relationship with the second tile, with the other flange of the second tile received in one of the recesses of the third tile.

3,877,191

CONNECTOR ASSEMBLY AND SUPPORT POST

Robert J. Munsey, Grand Rapids, Mich., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 7, 1974, Ser. No. 467,755
Int. Cl. E04b *2/82*; **E04c** *3/30*
U.S. Cl. 52—632 **10 Claims**

8. A length adjusting post bottom adaptor for space dividing panel systems comprising:

a first member adapted to be forcibly fit into the bottom end of a panel supporting post, a bore extending through said first member having at least two different diameters defining a shoulder at their intersection;

a second member constructed and arranged to be received in part in said bore having a base portion and a shank portion extending centrally therefrom and an annular recess in said base portion surrounding said shank portion, said shank portion having at least two different external diameters defining a shoulder at their intersection, said shank portion being of greater length than said bore in said first member and, means on said shank portion and said bore cooperating to permit limited axial movement between said first and second members while restricting rotational movement therebetween.

3,877,192

ASSEMBLAGE OF PIECES OF A METAL FRAME

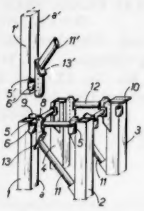
Roger Metailler, Grenoble, France, assignor to Richier, Paris, France

Filed May 15, 1973, Ser. No. 360,585
Claims priority, application France, May 16, 1972, 72.17427
Int. Cl. E04k *12/00*
U.S. Cl. 52—638 **9 Claims**

1. A generally vertical mast structure designed for end-to-end assembly of upright structural units on top of each other in mutual abutting relationship of the adjacent ends of two successive upright units, namely, the upper end of a first upright unit and the lower end of a second upright unit positioned immediately above said first upright unit and extending upwardly, said first and second upright units being fastened endwise to each other by associated bolting means which extend in a longitudinal direction with respect to said mast structure, wherein the improvement comprises the combination of: an end plate fastened with an upright unit end and flanging the same, said end plate having:

i. a bearing face exposed to the adjacent end of the next successive upright unit to be engaged thereby for abutment in said longitudinal direction, and

ii. exposed peripheral sides extending in a transverse direction with respect to said mast structure; and end ribs



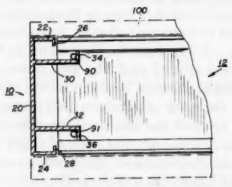
fastened with an upright unit end and having exposed protruding borders which project longitudinally beyond said end plate at said peripheral sides thereof past the adjacent end of the next vertically successive upright unit, said protruding borders of said end ribs positively engaging sidewise said next successive upright to abut the same against relative displacement in said transverse direction and taking up stresses in such transverse direction whereby said bolting means is relieved from such tranverse stresses.

3,877,193

METAL WALL FRAME CONSTRUCTION

Raymond L. Hall, 8 Knollwood Trl., E., Brookside, N.J. 07926

Filed July 25, 1973, Ser. No. 382,582
Int. Cl. E04c *2/42*, *5/04*
U.S. Cl. 52—665 **6 Claims**



1. A metal wall frame construction for assembly and providing a frame support for wall panel members, said assembly including: (a) a plate member of metal and having a generally channel-like configuration with the base portion of a substantially flat exterior support surface and with two substantially like edge portions extending at substantially right angles to the base exterior surface, each of said edge portions forming an outwardly facing supporting surface for a wall panel member, each edge portion at its upper distal end formed with a continuous shelf supporting surface, these supporting surfaces laying in a common plane parallel to the base portion support surface; (b) at least two intermediate rib portions intergrally attached to the base and extending from the same side of the base as the edge portions, each intermediate rib extending further from the base support surface than the outer end portions, each intermediate rib formed with an outwardly facing underlip engaging surface a short distance above the plane of the supporting surfaces of the end portion; (c) a stud member of generally I-beam like configuration with each of the ends of the web joined to a flange, the outwardly facing

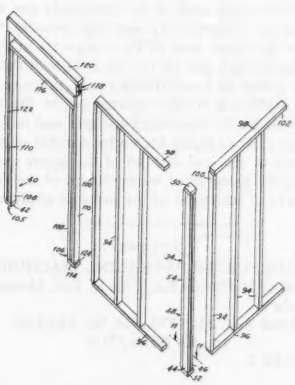
surfaces of the flanges substantially parallel to each other and spaced at a distance which coincides with the apart spacing of outwardly facing supporting surfaces of the edges of the plate member, each flange also having an inwardly facing surface with the space between the opposed facing surfaces sized to slidably engage and pass the outwardly facing engaging surface of the intermediate rib portions of the base; (d) a plurality of slots transverse of and formed only in the intermediate rib members of the plate and of a depth sufficient to permit the entrance of the web of the stud into the slot until said transversely cut end of the stud engages and is supported by the upper edges of the end portions of the plate member, said slots having a width sufficient to slidably engage and retain the web of the stud, and (e) means formed in the web of the stud so that with the web mounted in the slots in the ribs of the plate member and the flanges of the stud resting on the edge portions of the plate member, cooperative means is used to engage the means in the web and the underlip engaging surface of the intermediate rib to lock the stud to the plate member and causing the outer surfaces of the edge portions of the plate member and the outwardly facing surfaces of the stud to form two planes parallel to each other and supporting surfaces for the mounting of panels thereto.

3,877,194

STRUCTURAL CORNER POST

Richard W. Matuschek, Birmingham, and William Garth, Jr., Sterling Heights, both of Mich., assignors to Univiron Corporation, Southfield, Mich.

Division of Ser. No. 254,031, May 17, 1972, Pat. No. 3,774,362. This application June 6, 1973, Ser. No. 367,370
Int. Cl. E04c *3/36*
U.S. Cl. 52—730 **4 Claims**



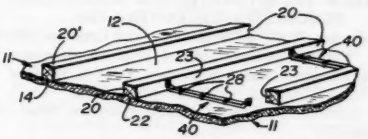
1. A load supporting corner post adapted for use in the framing system of a building structure comprising a vertically extending elongated column, the top and bottom surfaces of said column being flat and parallel, each of said top and bottom surfaces being divided into first and second zones, and upper and lower generally flat end caps overlying and secured to the first zones of said top and bottom surfaces respectively in parallel relation and extending in the same direction, and end caps including vertically aligned overhanging edge portions which form a female receptacle with an adjacent and intermediate vertical surface on said column, said female receptacle being adapted to receive therebetween a vertical structural member, the second zones of said top and bottom surfaces overlying a laterally extending vertical edge portion of said column which form a male connector which is adapted for engagement with the end portions of upper and lower horizontally extending structural members, said vertical edge portion and said intermediate vertical surface being located 90° apart, said column comprising a pair of longitudinally extending structural elements arranged in parallel relation having the opposing longitudinal surfaces spaced slightly apart and a third longitudinally extending structural element abutting and arranged perpendicular to said pair of structural elements, said pair and said third structural elements being of substantially equal length, said third structural element forming said laterally extending vertical edge portion.

3,877,195

PANEL ATTACHMENT SYSTEM

Maurice J. Marchello, Hickory Hills, and Gordon H. Bassett, Buffalo Grove, both of Ill., assignors to United States Gypsum Company, Chicago, Ill.

Division of Ser. No. 241,612, March 27, 1972. This application Nov. 2, 1973, Ser. No. 412,060
Int. Cl. E04b *5/57*
U.S. Cl. 52—741 **4 Claims**



1. In a method of constructing a framed assembly comprising framing members, at least one gypsum panel having a decorative surface and a back surface, anvil-shaped metal strips secured to the members and means holding the strips in proper relation to the back surface, the method including the steps of positioning at least two framing members and a plurality of strips across the back surface so that the strips bridge the space between the members and are generally perpendicular thereto, and fastening the strips to the back surface and to the framing members, the fastening step including the steps of projecting the holding means into only the panel back surface, the improvement comprising said attaching step including the steps of first intimately attaching the strips to the back surface of the panel, and thereafter attaching the ends of the strips to non-panel-contacting sides of two adjacent ones of the members without permitting the strips to extend under the members, whereby the strips are insured intimate contact with the back surface regardless of any warping present in the members.

3,877,196

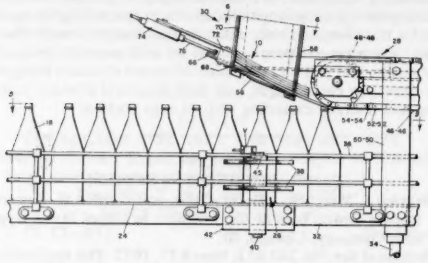
APPARATUS FOR APPLYING CARRIER GRIDS TO BOTTLES

Robert W. Vergobbi, Braintree, Mass., assignor to Pneumatic Scale Corporation, Quincy, Mass.

Filed Nov. 8, 1973, Ser. No. 413,780
Int. Cl. B65b *21/00*
U.S. Cl. 53—3 **18 Claims**

14. The method of applying grids to the tops of capped bottles comprising moving bottles continuously along a predetermined path, supporting a stack of grids above the path of movement of the bottles inclined thereto such that an extension of the plane of inclination of the lowermost grid intersects the path of movement of the tops of the bottles at an acute angle, ejecting the lowermost grid from the stack and advancing its leading end at said angle to said plane of intersection so that the forward movement of a bottle along said path into engagement with the leading end of the lowermost grid at said place of intersection engages and withdraws the grid from the stack, supporting the lowermost grid while it is being ejected and withdrawn against upward displacement so as to deposit

the grids on the tops of a number of bottles corresponding in number to the number of bottles the grid is designed to hold



and progressively applying pressure to the withdrawn grid to press it downwardly over the caps onto the necks therebelow.

3,877,197

METHOD AND APPARATUS FOR FILLING AND SEALING PLASTIC CONTAINERS

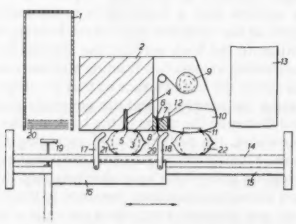
Kenneth Cayton, Welwyn Garden City, and Grahame Melvin Reade, Wheathampstead, both of England, assignors to Imperial Chemical Industries Limited, London, England

Filed Mar. 15, 1973, Ser. No. 341,605

Claims priority, application United Kingdom, Mar. 28, 1972, 14451/72

Int. Cl. B65b *31/04*

U.S. Cl. 53—22 B **7 Claims**



1. In a method of filling and sealing a flexible plastics container, closed by gas-tight seals except at a filling aperture in its wall, to produce a package having contents at superatmospheric pressure, by placing the container against a smooth surface with said aperture located over an orifice in said surface, said orifice being connected to a source of gas at superatmospheric pressure and said surface being of such smoothness that the aperture may be sealed thereby against the substantial escape of gas when the container is inflated and held with its apertured wall pressed against said surface, inflating the container by the introduction of gas through said orifice from said source of gas, and while holding the inflated container with said aperture in substantially gas-tight juxtaposition to said surface, sliding the container along, against and relative to said surface, to bring that portion of the wall of the container which surrounds said aperture into contact with a supported flexible sealing strip held in substantially continuous relationship to said surface, and sealing the sealing strip to the wall of the container around said aperture, while said container is substantially in gas-tight juxtaposition to said surface: the improvement consisting in that the container is slid along a surface on which the flexible sealing strip and the container wall surrounding the aperture are held during the sealing of the strip to the wall of the container wherein the surface follows effectively a convex curve across each and any diameter of the area of the strip that is to be sealed to the container wall.

3,877,198

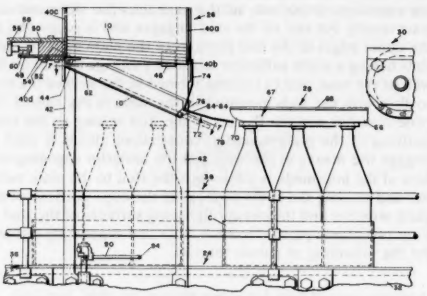
APPARATUS FOR APPLYING CARRIER GRIDS TO BOTTLES

Robert W. Vergobbi, Braintree, Mass., assignor to Pneumatic Scale Corporation, Quincy, Mass.

Filed Nov. 8, 1973, Ser. No. 413,781

Int. Cl. B65b *21/00*

U.S. Cl. 53—48 **24 Claims**



1. Apparatus for applying a carrier grid to the tops of the containers of groups of containers, said grid having top encircling elements corresponding in number to the number of containers in the group to which it is to be applied, said elements being adapted to be expanded over the tops of the containers by downward pressure applied to the grid, comprising a conveyor for moving successive groups of containers along a predetermined path, pressure-applying means mounted above the conveyor and extending therealong beneath which the upper ends of the containers are moved by the conveyor for progressively applying pressure to a grid deposited on the upper ends of the containers in the group, means for depositing a grid on the upper ends of the containers in each group as it approaches said pressure-applying means, and stabilizing means situated above the conveyor between the means for depositing the grid and the pressure-applying means for engaging the entire number of top encircling elements of the grid with all of the upper ends of the containers in the group prior to movement of the containers into the sphere of operation of the pressure-applying means.

3,877,199

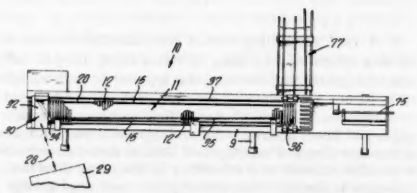
FRANKFURTER PACKAGING MACHINE

Arnold Lipes, 6521 Merton Rd., Cote St. Luc, Montreal, Quebec, Canada

Filed Aug. 31, 1973, Ser. No. 393,476

Int. Cl. B65b *57/20*

U.S. Cl. 53—59 R **9 Claims**



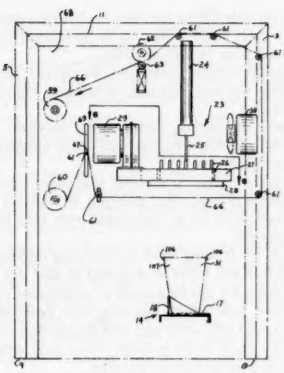
1. A loading apparatus for packaging rod-like articles in a container, said apparatus comprising an endless conveyor having spaced-apart conveying elements thereon, conveyor drive means, a deflector housing positioned above said conveyor at a receiving end therefor for receiving said rod-like articles aerially projected therein along their longitudinal axis

and along a path angularly disposed to the path of movement of the conveyor and in a sequential manner, said deflector housing having a vertical side wall disposed substantially parallel to said conveying elements and a downwardly inclined upper wall adjacent thereto, said articles being projected axially against said upper wall whereby they are caused to deflect in a downward direction so that said articles are positioned and conveyed by respective ones of said conveying elements and being transported by said conveyor at a rate faster than said articles are received by said deflector housing, said conveyor having a delivery end for delivering a predetermined number of said articles to a container, counter means for detecting and counting said articles transported by said endless conveyor, and accumulator adjacent said delivery end of said conveyor for receiving said articles therein, said accumulator being activated to interrupt and receive articles being discharged from said delivery end of said conveyor and to release accumulated articles therein upon further activation.

3,877,200
CAPPING DEVICE

Rubin Feldman, Ladue, Mo., assignor to TSI, Inc., St. Louis, Mo.

Filed June 6, 1973, Ser. No. 367,485
Int. Cl. B65b *57/02, 7/28*
U.S. Cl. 53—67 **19 Claims**



1. A capping machine for closing an open end of a cup including a fluid drive system for operating said machine from a source of fluid power, comprising:

on-off switch means for actuating said machine responsive to said cup placement in said machine;

valve means for controlling said drive system connected to said on-off switch means;

first actuator means connected to said valve means;

second actuator means connected to said valve means;

switch means responsible to travel of at least one of said first and said second actuator means;

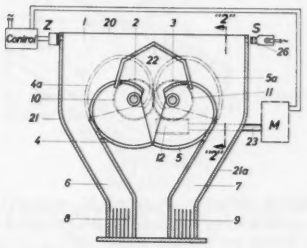
cup drive means connected to said switch means and responsive to energization thereof; and

timer means connected between said last mentioned switch means and said valve means for reversing said valve means after a predetermined elapsed time period, said valve means reversal acting to return said cup drive means, said first actuator and said second actuator to an initial position.

3,877,201
FUNNELLING DEVICE FOR CIGARETTE PACKING MACHINES

Alfred Schmermund, 62 Koernerstrasse, 5280 Gevelsberg, Germany

Filed Oct. 5, 1973, Ser. No. 403,731
Claims priority, application United Kingdom, Oct. 26, 1972, 49382/72
Int. Cl. B65b *19/10*
U.S. Cl. 53—151 **7 Claims**



1. A funnelling device comprising, in combination:

vertically extending wall members defining a generally funnel-shaped housing, uppermost extremities of said wall members defining a planar inlet opening;

two deflector members each pivotably mounted to be angularly displaceable about respective horizontal axes disposed below said opening at the same level in said housing;

a stationary guide member having an upper portion mounted in said housing below said inlet opening to divide said housing into two passages and having mutually divergent respective slotted portions dependent from said upper portion, one of said deflector members defining a movable wall portion of one of said passages and the other of said deflector members defining a movable wall portion of the other of said passages, and each of said deflector members being of comb-like construction to enable said deflector members on being pivotably displaced to pass through the slots in said respective slotted portions of said stationary guide member; and

displacement means to effect substantially equal and opposite angular displacements of each of said deflector members between retracted and non-retracted positions thereof, each said deflector member having an exterior surface portion generally spirally disposed relative to its axis, whereby angular displacement of each said deflector member from said retracted to said non-retracted positions reduces the cross-section of a passage portion of said housing defined between said exterior surface portion and the plane of said inlet opening.

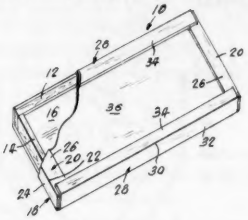
3,877,202
PACKAGING MACHINE

Ernest G. Hunt, Lachine, Quebec, Canada, assignor to Domtar Limited, Montreal, Canada

Filed Oct. 9, 1973, Ser. No. 404,288
Claims priority, application Canada, Oct. 12, 1973, 153,800
Int. Cl. B65b *11/18, 49/08*
U.S. Cl. 53—207 **9 Claims**

1. A packaging machine for forming packages each composed of a stack of elements surrounded by a peripheral frame and wherein the height of said stack may vary from package to package while the height of said peripheral frame remains substantially constant from package to to package, each said package including a bottom forming blank and a top panel overlying said stack and said frame, said machine comprising, a loading station, a pair of side by side pressing and folding

stations, means to deliver said package from the loading station to the first of said pressing and folding stations in a first direction, means to transfer said blank from said first to the other of said pair of pressing and folding stations in a direction substantially perpendicular to said first direction, each said pressing and folding station incorporating folding means to fold flaps at one pair of opposite ends of the package into a position overlying said top panel and said frame, said flaps projecting inward of said package relative to said frame, press-



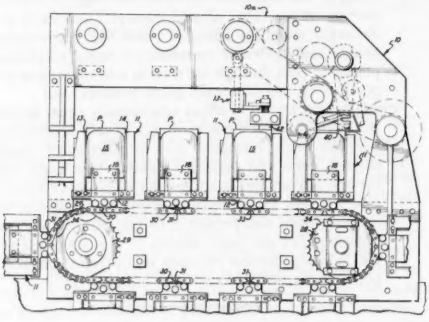
ing means, means to move said pressing means from an inoperative position to an operative pressing position wherein the flaps so folded are pressed against the top of the package, resilient means on a pressing face of said pressing means, said resilient means in said pressing position overlying said frame and projecting inwardly thereof thereby to force said flaps towards said frame and past the inner edge of said frame toward the top of said stack and means defining spaces in said resilient means to accommodate portions of said folding means when said pressing means is in pressing position.

3,877,203

FLAT TURRET WRAPPING MACHINE

Andrew W. Anderson, West Caldwell, N.J., assignor to Scandia Packaging Machinery Company, Clifon, N.J.

Filed Apr. 15, 1974, Ser. No. 461,083
Int. Cl. B65b *11/16, 49/08, 49/14*
U.S. Cl. 53—228 **20 Claims**



1. An apparatus for wrapping an article comprising:

a. means providing an article having a sheet of wrapping material draped therearound so that the ends of the sheet project outwardly from one side and along opposing edges of the article,

b. means for moving the draped article along a path to a stationary folding work station,

c. means for folding one of the projecting ends underneath the other projecting end in overlapping relationship along said one side of the article which is maintained stationary in said folding work station,

d. said folding means being located at said folding work station along said path,

e. said folding means including a lifting mechanism for lifting a first of the projecting ends away from the article and a folding element that folds the second projecting end along the edge of the article underneath said first end,

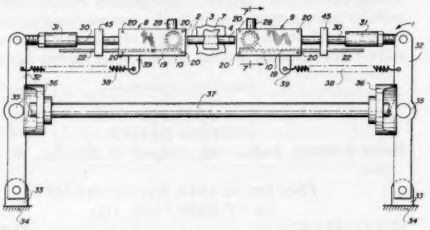
f. means for sealing the wrapping material along the overlapped ends of the wrapping sheet.

3,877,204

CAPSULE-FILLING MACHINES

Richard R. Alter, 608 McDowell St., Delavan, Wis. 53115

Filed Aug. 14, 1973, Ser. No. 388,185
Int. Cl. B65b *7/28;* **B67b** *1/04*
U.S. Cl. 53—328 **4 Claims**



1. In a capsule-filling machine embodying means for holding a capsule body portion having an opening therein in position to receive a plug in said opening,

a. a longitudinally stationary elongated holding member having another opening extending transversely therethrough,

b. means for rotating said member between

1. one position wherein said other opening faces in one direction, and

2. another position wherein said other opening therein is disposed in another position in which it is disposed in position to be in alignment with said first mentioned opening,

c. means for feeding an elongated plug into said other opening when the latter is disposed in said one position, and

d. means for feeding such an elongated plug outwardly through said other opening into position effective to insert said plug into said first mentioned opening in such a positioned body portion when said other opening is disposed in said other position,

e. said means for feeding a plug outwardly through said other opening comprising a plunger reciprocable through said other opening,

f. said other opening being disposed

1. in upstanding position when in said one position, and

2. in substantially horizontally extending position when in said other position,

g. said means for feeding a plug comprising a chute for holding a plurality of such plugs disposed in longitudinally stacked relation therein,

h. said chute being disposed over said holding member in position to feed one of said plugs vertically into said other opening when said other opening is disposed in said one position,

i. said means for rotating said holding member comprising a rack

1. operatively engaged therewith, and

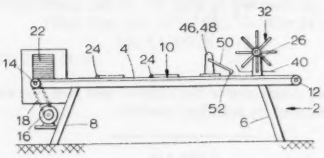
2. reciprocable through a path of travel effective to oscillate said other opening between said one and other positions, and

j. said means for feeding a plug outwardly through said other opening comprising a plunger reciprocable with said rack in parallel relation thereto for reciprocation through said other opening.

3,877,205
PACKING MACHINE

Marius Gundersen, Larvik, Norway, assignor to Vefi A/S, Larvik, Norway

Filed Dec. 14, 1973, Ser. No. 424,830
Claims priority, application Norway, Dec. 15, 1972, 4657/72
Int. Cl. B65b 7/26
U.S. Cl. 53—376 4 Claims



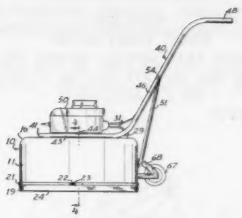
1. In a table type machine for packing goods into containers having lids and closing means of the press-button type with complementary container-locking elements located in respectively the container and lid edge portions, comprising an endless conveyor belt for sequentially receiving containers in an open position at an infeed end thereof for filling said containers with said goods, and conveying said filled containers towards a closing station at the outlet end of said conveyor belt with said lids being in a generally closed position, the improvement comprising; container advancing cleats attached to the conveyor belt in spaced relationship along the upper run thereof, said cleats each having surfaces therein conforming to the configuration of the containers and means to position each of the containers on the belt against one each of said advancing cleats; a rotor wheel having a plurality of circumferentially spaced, radially extending spoke members being positioned above said endless conveyor belt proximate said closing station, the radially outer free ends of said spoke members following a circular path of movement intersecting the linear movement of said containers on said conveyor belt; a first one of said spoke members, upon said container reaching a predetermined position relative to said rotor wheel, being contacted by said container in pushing engagement so as to impart rotation to said rotor wheel and cause the subsequent spoke member to pivoted downwardly into punching contact with the container-locking element on the lid edge portion so as to bias the latter toward and into locking engagement with the complementary element on said container.

3,877,206
MOWING MACHINE

John F. Cody, and George W. Sites, both of Quincy, Fla., assignors to Walter S. McNeilly and Gerald D. Bryant, both of Tallahassee, Fla., part interest to each

Filed Nov. 7, 1962, Ser. No. 236,108
Int. Cl. A01d 73/00
U.S. Cl. 56—12.8 14 Claims

1. In a mowing machine of the class wherein a housing carries a prime mover which drives a blade in a predetermined path of travel for engaging vegetation to be severed from the ground, the combination therewith of means for directing air against the ground to support said housing above the ground,

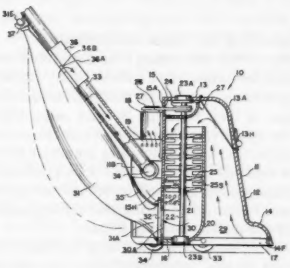


and means for shielding a portion of the path of travel of the blade from flow of the air.

3,877,207
APPLIANCE

Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840

Filed Feb. 16, 1973, Ser. No. 333,064
Int. Cl.[2] A01D 49/00
U.S. Cl. 56—13.2 10 Claims



1. A machine of the character described comprising in combination:

a carriage,

air scoop inlet means disposed at the front end of said carriage and positioned just above the ground for receiving foliage from the ground,

an elongated tubular housing extending axially upwardly of said carriage and connected to said air scoop inlet means, a shaft axially supported for rotation within said tubular housing about substantially the longitudinal axis of said housing,

a motor supported by said carriage and means for coupling said motor to power rotate said shaft supported in said tubular housing,

a plurality of blades supported by said shaft and protruding outwardly therefrom, said blades being supported by said shaft within a portion of said tubular housing so as to define an operating blade portion and a discharge portion which is void of blades,

means, including the movement of air by said blades supported by said shaft when said shaft is rotated with the operation of said motor, for generating a flow of air through said housing which air flow is sufficient to draw foliage off the ground through said air scoop inlet means, a plurality of stator blades supported adjacent the wall of said tubular housing and aligned between respective blades supported by said shaft for cooperating therewith in comminuting foliage introduced into said housing, and means connected to the end of said tubular housing and located at said discharge portion for receiving material after it has passed through said tubular housing and has

been comminuted by the action of the blades in said housing.

3,877,208

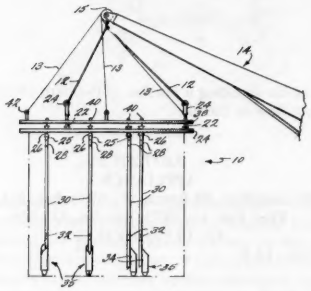
FRUIT HARVESTER

Fred A. Wesemann, 1815 Jolly St., Apopka, Fla. 32703

Filed May 23, 1974, Ser. No. 472,824

Int. Cl. A01g *19/08*

U.S. Cl. 56—328 R **15 Claims**



1. Fruit harvesting apparatus comprising:

a. a plurality of fruit harvesting tube assemblies, each of said assemblies including (i) a tubular body portion, (ii) an open top having a sloping surface, (iii) means for severing the stems of fruit received by said open top, and (iv) means for selectively either opening or closing the bottom of said tube, said means including members having sloped surfaces exterior of said tubular body portion,

b. a supporting plate adapted to be operatively connected to a crane boom for lowering and raising said apparatus into and out of fruit-bearing trees,

c. means for operatively connecting said plurality of tube assemblies to said supporting plate for allowing movement of said tubes out of interfering relationship with any tree limbs they might engage during lowering and raising said apparatus into and out of a tree, and

d. means for actuating said means for selectively opening and closing said bottoms of said tubes for opening said bottoms and allowing fruit harvested by said tubes to pass through said tubes.

3,877,209

SYSTEM FOR MEASURING THE DRAFT OF OPEN-END SPINNING MACHINES

Pavel Seidl, and Milos Mladek, both of Usti Nad Orlici, Czechoslovakia, assignors to Elitex, Zavody textilniho strojirenstvi generalni reditelstvi, Liberec, Czechoslovakia

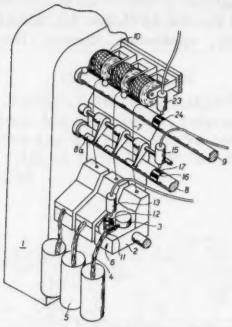
Filed Sept. 17, 1973, Ser. No. 397,742

Claims priority, application Czechoslovakia, Sept. 15, 1972, 6322-72

Int. Cl. D01h *13/32, 1/12*

U.S. Cl. 57—34 R **5 Claims**

1. A system for measuring and indicating the draft of an open end spinning unit having rotary feed means for delivering fibrous material, a rotary twisting means for spinning the fibers into a yarn and a rotary withdrawing means for taking up the yarn, comprising a first detector means located at said withdrawing means for sensing the rotation thereof and providing an output having a value proportional to the number of revolutions thereof, a second detector means located at said feeding means for sensing the rotation thereof and providing an output having a value proportional to the number of revolutions thereof, a first counter, said first detecting means being connected to the input of said first counter, gate means interposed between said first detector and said first counter, a second counter, said second detecting means being connected to the input of said second counter, the output of said second



counter being connected to the input of said gate, to read out the value received by said first counter.

3,877,210

SYSTEM FOR MEASURING THE COUNT AND TWIST OF SPUN YARN IN OPEN-END SPINNING

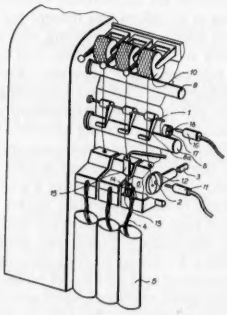
Pavel Seidl, Usti nad Orlici, Czechoslovakia, assignor to Elitex, Zavody textilniho strojirenstvi generalni reditelstvi, Liberec, Czechoslovakia

Filed Sept. 17, 1973, Ser. No. 397,743

Claims priority, application Czechoslovakia, Sept. 15, 1972, 6321-72

Int. Cl. D01h *13/32, 1/12*

U.S. Cl. 57—34 R **9 Claims**



1. A system for measuring and indicating the count and twist of spun yarn formed in an open end spinning unit having feed means for delivering a sliver of fibrous material, a rotary turbine twisting means for spinning said fibrous material into a yarn and withdrawal means for taking up the spun yarn comprising detecting means located at each one of a selected pair of said feeding means, twisting means and withdrawing means for sensing the delivery of the fibers, the twist of the spun yarn and the speed of withdrawal respectively and for providing an output having values proportional to each thereto, a first counter connected to one of said detectors for receiving the output thereof, gating means interposed between said first counter and its associated detector, a second counter connected to the other of said detectors to receive the output thereof, switch means interposed between said second counter and said gating means, said switch means providing a signal upon the reaching in said second counter of a predetermined input value, said signal operating to close said gating means and stop the passage of detected value to said first counter and means for indicating the value received by said first counter.

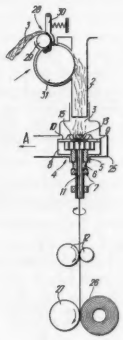
3,877,211
MACHINE FOR RINGLESS SPINNING OF TEXTILE FIBRES

Alexandr Ivanovich Saveliev, ulitsa Dovatora, 12, kv. 36; Elizaveta Andreevna Brezulova, 2 Donskoi Proezd, 6, kv. 36; Alexei Gavrilovich Moskalev, Leninsky prospekt, 62/1, kv. 344; Gely Georgievich Pavlov, Petrovsko-Razumovsky proezd 7, kv. 131, all of Moscow; Alexandr Alexeevich Sharychenkov, ulitsa Experimentalnaya, 1, kv. 78, Penza; Vladimir Vladimirovich Avdeev, ulitsa Experimentalnava, 2, kv. 78, Penza; Valentin Tikhonovich Pastukhov, ulitsa Experimentalnaya, 1, kv. 96, Penza; Grigory Andreevich Ermilov, 2 Donskoi proezd, 6, kv. 41, Moscow; Nikolai Andreevich Drozdov, ulitsa Roschinskaya, 18, kv. 18, Klimovsk Moskovskoi Oblasti; Vladimir Petrovich Radovitsky, 2 Donskoi proezd, 6, kv. 45, and Vasily Antonovich Parnev, Rusakovskya ulitsa, 22, kv. 77, both of Moscow, all of U.S.S.R.

Filed Mar. 13, 1974, Ser. No. 450,812

Int. Cl. D01h *1/12*

U.S. Cl. 57—58.89 **11 Claims**



1. A machine for ringless spinning of textile fibres, comprising: a feeding device including a passage through which the fibres can be conveyed; a spindle mounted for rotation; means for imparting rotation to said spindle in operation of the machine; a sleeve mounted on said spindle; a rotor in the form of a multi-vane wheel mounted on said sleeve and adapted, upon rotation of said spindle, to create a stream of air capable of conveying the fibres; a disc belonging to said multi-vane wheel and having a central opening and a fibre-supporting surface adapted to receive said fibres and to take part in forming said fibres into a yarn in the course of rotation of said spindle jointly with said rotor; a plurality of slots made through said disc, said slots being spaced from said central opening and extending away from said central opening toward the periphery of said disc; projection means situated on said fibre-supporting surface of said disc between the adjacent pairs of said plurality of slots, said projection means being adapted to assist in retaining said fibres at said fibre-supporting surface, said projection means being spaced equidistantly from the axis of rotation of said rotor; and means for withdrawing said yarn through said central opening of said disc.

3,877,212
APPARATUS FOR DRIVING AND SUPPORTING A SPINNING ELEMENT

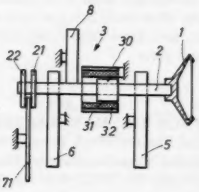
Rolf Canzler, Ingolstadt, Germany, assignor to Schubert & Salzer Maschinenfabrik Aktiengesellschaft, Ingolstadt, Germany

Filed Jan. 22, 1973, Ser. No. 325,503

Claims priority, application Germany, Jan. 26, 1972, 2203586

Int. Cl. D01h *1/20*

U.S. Cl. 57—100 **1 Claim**



1. Apparatus for driving and supporting a spinning element having a shaft, comprising an electromotor having a rotor for driving said spinning element, said rotor being fixed on a part of said shaft, at least two shaft-supporting locations each having at least two supporting discs for rotatably supporting said shaft, the diameter of each supporting disc being a multiple of the diameter of the supported shaft, rotatable disc means for preventing axial shifting of said shaft and circumferential groove means carried by the shaft for receiving said rotatable disc.

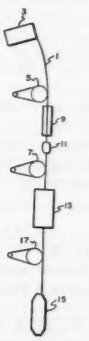
3,877,213
DRAW TEXTURED YARN AND PROCESS

Iain Mackay MacFarlane, Shelby, N.C., assignor to Fiber Industries, Inc., Charlotte, N.C.

Filed Jan. 19, 1972, Ser. No. 218,947. The portion of the term of this patent subsequent to Jan. 9, 1990, has been disclaimed.

Int. Cl. D02g *1/02, 3/22*

U.S. Cl. 57—140 R **15 Claims**



1. A fully drawn polyester multi-filament, false twist crimped, stabilized yarn having a total drawn denier of about 140 to 175, a denier per filament of about 0.5 to 10, a tenacity of about 2.5 to 4.0 grams per denier, an elongation of about 20 to 35 percent, a linear shrinkage below 15 percent, a liveliness factor of up to about but less than 20 and a filamentation value of about below 0.4.

10. In a process for producing a drawn false twist crimped polyester multifilament yarn having a total denier of about 140 to 175, wherein an undrawn or partially undrawn polyester yarn is fed into a simultaneous drawing and false twist

crimping zone consisting of a heater and false twister positioned between a feed means and draw means and wherein the false twist backs upstream into the heated zone wherein the false twist is set into the yarn and wherein the yarn necks at a draw point without the presence of snubbing means with the false twist passing back through the draw necking segment of the yarn on into the undrawn yarn, the level of twist decreasing about proportional to the increasing denier of the yarn, the improvements which comprise inserting about 60 to 80 turns per inch of false twist into the yarn while drawing the yarn about 3.20 up to but less than 3.40 times to produce a yarn having a tenacity of at least 3.0 gpd and an elongation of at least 20 percent, said draw ratio being less than the optimum draw ratio of said yarn.

3,877,214

METHOD FOR THE MANUFACTURE OF YARN

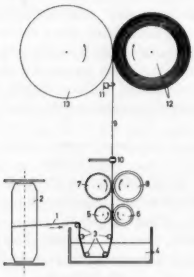
Herman Antonius Van der Werf, Borne, Netherlands, assignor to N.V. Hollandse Signaalapparaten, Hengelo, Netherlands

Filed July 10, 1972, Ser. No. 270,152

Claims priority, application Netherlands, Oct. 5, 1971, 13624

Int. Cl. D02g *3/40*

U.S. Cl. 57—164 **7 Claims**



1. A method of manufacturing twistless yarn from a staple fibre material having at least two fibre components, one of which is potentially adhesive upon application at least of moisture, including the steps of:

drafting a roving of said staple fibre material in a wet condition to form a fibrous sliver,

activating said potentially adhesive fibre component to render it adhesive, and

completing said adhesive activation subsequent to said drafting step such that said fibres are bonded together by said adhesive component.

3,877,215

RESONATOR FOR A TIMEPIECE

Christof Burckhardt, Renens, and Dirk Helms, Bussigny, both of Switzerland, assignors to Ebauches S. A., Neuchatel, Switzerland

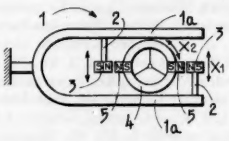
Filed Dec. 10, 1973, Ser. No. 423,131

Claims priority, application Switzerland, Dec. 13, 1972, 18102/72

Int. Cl. G04c *3/02, 3/04;* **H03d** *3/00*

U.S. Cl. 58—28 R **8 Claims**

1. Resonator for a timepiece comprises two oscillating devices the proper frequencies and the virtual energies of which are different, the energy transmitting themselves from one to the other by a connecting means having a non linear characteristic, so that the low frequency oscillating device, the virtual energy of which is the lowest, be synchronized by the high frequency oscillating device the virtual energy of which is the highest, characterized by the fact that the two oscillating devices comprise each at least one magnet moving with the vibrating member of the respective oscillating device, the magnetic fields produced by the said magnets constituting the



connecting means between the two oscillating devices ensuring the transmission of their energies.

3,877,216

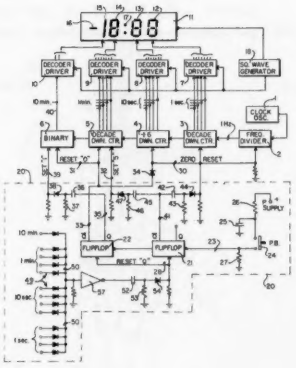
DIGITAL DOWNCOUNT TIMER

George Ralph Mounce, 18 Bridle Path, Willowdale, Ontario, and John Douglas Sainsbury, 407 Castlefield Ave., Toronto 12, Ontario, both of Canada

Filed June 21, 1974, Ser. No. 481,860

Int. Cl. G04f *3/06;* **G04b** *5/20;* **G06f** *7/38*

U.S. Cl. 58—39.5 **6 Claims**



1. A digital countdown timer for timing warning periods occurring before the START of an event where the warning period is marked by an initial warning signal commencing an interval of fixed duration preceeding said START, the timer comprising:

a. digital clock means including a chain of downcounters driving digital display means and driven by a clock pulse source;

b. a programmed controller operative to control the downcounters according to a cyclic program of multiple steps, the controller having manual actuator means for stepping it through said steps and the steps including a first step in which said downcounters all read zero count, and a second step with the downcounters all preset to read an initial count from which they are counted toward zero by said pulse source; and,

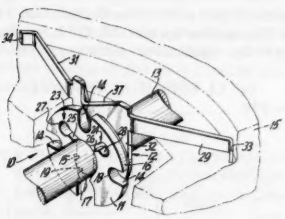
c. sensing means coupled to said downcounters and operative to sense a reading of the count in the downcounters corresponding with one of said steps, and said sensing means being responsive to the sensed count to stop said controller in a rest condition.

3,877,217

DIGITAL WATCH SWITCH DETENT DEVICE

Paul E. Hochstrate, 16 Lorraine Dr., Bristol, Conn. 06010

Filed Sept. 19, 1974, Ser. No. 506,369
Int. Cl. G04b *27/00*; G05g *5/06*
U.S. Cl. 58—85.5 7 Claims



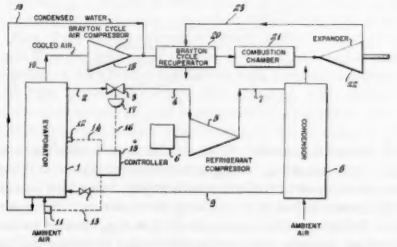
1. A switch detent device for digital watches having a stem extending into the watch case comprising:
- a detent retaining ring having a plurality of spaced slots about the periphery thereof and a central gripping portion which is mounted about the stem, and,
- a detent spring member including a body portion having an aperture therethrough which encircles the stem and a pair of outwardly extending spring arms which contact the watch case, said spring member having a protruding nose portion which engages the slots in the ring during indexing of the stem to establish various tactile positions.

3,877,218

BRAYTON CYCLE SYSTEM WITH REFRIGERATED INTAKE AND CONDENSED WATER INJECTION

William H. Nebgen, 4824 43rd St., New York, N.Y. 11377

Division of Ser. No. 180,282, Sept. 14, 1971, Pat. No. 3,788,066, which is a continuation-in-part of Ser. No. 34,717, May 5, 1970, Pat. No. 3,668,884. This application Jan. 2, 1974, Ser. No. 429,557
Int. Cl. F02b *43/12*
U.S. Cl. 60—39.05 5 Claims



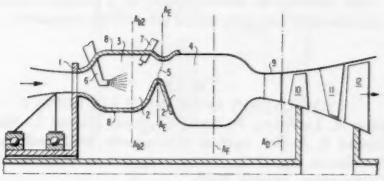
1. In a simple open cycle Brayton system including an air compressor, a combustion chamber and an expander, the improvement which includes, in combination, refrigerating the suction air to the compressor to a temperature at which water vapor in the air condenses, vaporizing the condensed water by introducing it into a portion of the Brayton cycle system between air compressor and combustion chamber, whereby efficiency of the system is increased and excess of air to the combustion chamber is reduced.

3,877,219

CONSTANT VOLUME COMBUSTION GAS TURBINE WITH INTERMITTENT FLOWS

Hermann Hagen, Dachau, Germany, assignor to Motoren-und Turbinen-Union Munich GmbH, Munich, Germany

Filed July 2, 1973, Ser. No. 375,755
Claims priority, application Germany, June 30, 1972, 2232025
Int. Cl. F02c *5/02*; F02d *5/02*
U.S. Cl. 60—39.38 67 Claims



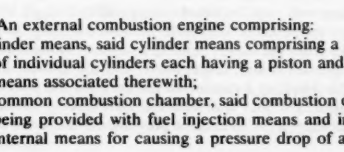
1. A gas turbine engine arrangement for constant volume combustion comprising:
- combustion chamber means,
- compressor means arranged upstream of said combustion chamber means,
- air supplying means for supplying air from said compressor means to said combustion chamber means,
- ignition means for igniting a mixture of fuel and a portion of said air in said combustion chamber means,
- turbine means arranged downstream of said combustion chamber means,
- exhaust gas accepting means for accepting exhaust gases from said combustion chamber means as driving gases for said turbine means,
- movable valve means for selectively interrupting communication between said compressor means and said combustion chamber means by closing off said air supplying means at least part of the time when constant volume combustion is occurring in said combustion chamber means,
- and control means for controlling said valve means and ignition means such that said exhaust gases are made up of alternating flows of hot combustion gases and cooling air with said cooling air being forced out of said combustion chamber means by and ahead of the following hot combustion gases.

3,877,220

COMBUSTION ENGINE WITH REDUCED EMISSIONS

Mario Girodin, 20, place de la Madeline, Paris, France

Filed Mar. 9, 1973, Ser. No. 339,834
Claims priority, application France, Mar. 10, 1973, 73.08573
Int. Cl. F02g *3/02*
U.S. Cl. 60—39.63 9 Claims



1. An external combustion engine comprising:
- cylinder means, said cylinder means comprising a plurality of individual cylinders each having a piston and exhaust means associated therewith;
- a common combustion chamber, said combustion chamber being provided with fuel injection means and including internal means for causing a pressure drop of air deliv-

ered thereto to maintain substantially constant pressure therein while air is intermittently delivered thereto and exhaust products are intermittently withdrawn therefrom, said means for causing a pressure drop being juxtapositioned to said fuel injection means and the pressure drop resulting therefrom being sufficient to maintain uniform gas flow;

means for delivering air compressed in each of said cylinders to said combustion chamber upstream of said pressure drop causing means; and

means for delivering hot exhaust gases from said combustion chamber to said cylinders at a pressure which approximates the compressed air delivery pressure.

3,877,221

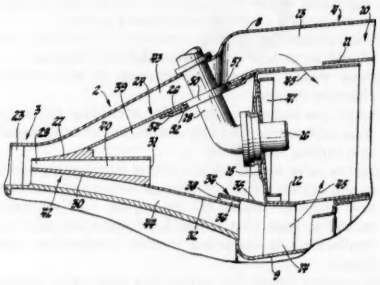
COMBUSTION APPARATUS AIR SUPPLY

Arthur H. Lefebvre, Bedford, England; Harold L. Stocker; Samuel B. Reider, both of Indianapolis, Ind., and Jerry G. Tomlinson, Speedway, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 27, 1973, Ser. No. 391,888

Int. Cl. F02c *3/00*

U.S. Cl. 60—39.65 **3 Claims**



1. In a gas turbine engine comprising a compressor with an annular axial outlet, outer and inner casing walls defining an annular combustion space connected to the outlet, and an annular combustion liner disposed between the said casing walls, the casing walls having forward portions diverging to define a diffusing zone beginning at the compressor outlet, the combustion liner having an upstream wall and outer and inner walls with openings for entrance of air into the liner in each of the said liner walls, the improvement comprising an airflow dividing diffuser disposed in the diffusing zone and connected to the upstream end of the liner, the diffuser having a snout providing an annular entrance adjacent the compressor outlet and at a mid-radius of the outlet, an outer diffuser wall extending from the snout to the outer wall of the liner, and an inner diffuser wall extending from the snout to the inner wall of the liner; the said diffuser walls bounding a diffusing flow path to the upstream liner wall and defining with the upstream liner wall an air space, the outer diffuser wall and outer casing wall defining a diffusing flow path to the outer liner wall, the outer diffuser wall blocking flow between the said air space and the outer liner wall, and the inner casing wall defining a diffusing flow path to the inner liner wall; the said diffusing flow paths taking air from the outer, central, and inner annular zones of the compressor outlet, respectively; and the diffuser defining means for diverting a portion of the air from the path leading to the upstream liner wall into the path leading to the inner liner wall responsive to relative pressure conditions in the said paths.

3,877,222

METHOD FOR THE OPERATION OF AN INTERNAL COMBUSTION ENGINE WITH AFTERBURNER CHAMBER AND INSTALLATION FOR CARRYING OUT THE METHOD

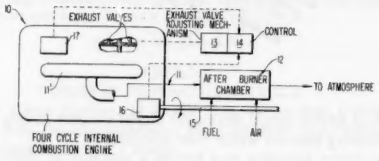
Hans O. Scherenberg, Stuttgart, Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart-Unterturkheim, Germany

Continuation-in-part of Ser. No. 81,865, Oct. 19, 1970, abandoned. This application Nov. 10, 1972, Ser. No. 305,315

Claims priority, application Germany, Oct. 17, 1969, 1952268

Int. Cl. F02b *75/10;* **F01l** *1/34*

U.S. Cl. 60—274 **14 Claims**



2. A method according to claim **1**, characterized in that the advance of the initial opening of the exhaust valves takes place in dependence on both control magnitudes.

3,877,223

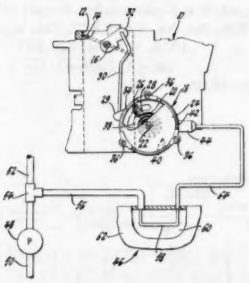
PRESSURIZED HOT AIR CHOKE

John M. Layton, Howell, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 27, 1974, Ser. No. 446,282

Int. Cl. F02b *75/10;* **F02m** *1/10*

U.S. Cl. 60—307 **2 Claims**



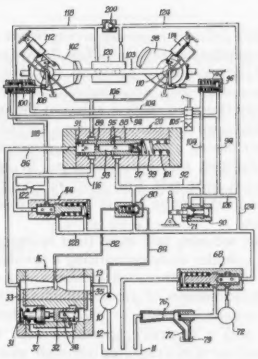
1. In an automatic choke of the type including a choke valve, and means including a thermostatic choke coil to operate the valve in accordance with engine heated air directed to a thermostatic housing enclosing the choke coil through a heat inlet fitting on said thermostatic housing, thence to an inlet manifold vacuum port connected to said thermostatic housing for producing a vacuum therein, the improvement comprising: means defining an exhaust crossover passage, a heat tube located within said exhaust crossover passage having an inlet and outlet, a heat pipe connected to the outlet of said heat tube and including an outlet end thereon connected to the heat inlet fitting; a reactor air injection pump having a discharge conduit, means driving said pump in accordance with engine speed, means communicating said discharge conduit with the inlet of said heat tube, the manifold vacuum port in said thermostatic housing being operative when the engine is running at high intake manifold vacuum levels to suck a stream of hot air from the pump discharge conduit through

said heat tube for heating air therein by exchange from the exhaust crossover passageway thence through said heat inlet for heating said choke coil to cause it to operate said choke valve into an open position, said reactor air injection pump operating at increased speed at wide open throttle conditions to produce an increased pressure in said discharge conduit and at the inlet of said heat tube to cause air to be directed therethrough for discharge through said heat inlet to said thermostatic housing when there is a reduced engine vacuum whereby hot air circulation through said thermostatic housing is maintained to produce a constant flow of air on the choke coil to prevent windup of the choke coil to close the choke valve following engine start operation.

3,877,224
SINGLE PUMP HYDROSTATIC TRANSMISSION CONTROL AND SUPPLY SYSTEM

Gordon W. Johnson, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 21, 1973, Ser. No. 427,087
Int. Cl. F16h *39/46*
U.S. Cl. 60—389 **18 Claims**

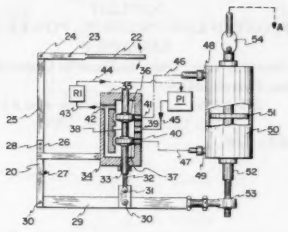


1. A supply and control system for a hydrostatic transmission including; a source of fluid under pressure, flow control valve means for providing a constant volumetric rate of fluid flow, first fluid communication means between said source and said flow control valve means, speed control valve means for regulating the flow of fluid from said constant volumetric rate of flow provided by said flow control valve means to speed control means of said hydrostatic transmission, second fluid communication means between said speed control valve means and said flow control valve means, and third fluid communication means between said speed control valve means and said speed control means of said transmission, said flow control valve means including a first housing and a flow regulating first spool movably disposed within said first housing, said spool having first and second chambers therein, said first chamber communicating with said first fluid communication means and said second chamber communicating with said second fluid communication means, first orifice means in said first spool between said first and second chambers for creating a drop in pressure of fluid flowing from said first chamber to said second chamber for causing movement of said first spool, said source including a fluid supply reservoir and a singular fluid pump, said hydrostatic transmission including a fluid pump and a fluid motor coupled by means of fourth fluid communication means, said fluid pump being reversible and having a variable capacity, said fluid motor having variable displacement.

3,877,225
SAWMILL FEEDWORK SYSTEMS AND IMPROVEMENTS THEREIN

James L. Sylvester, Salt Lake City, Utah, assignor to Gardner Machines, Salt Lake City, Utah

Filed Jan. 5, 1973, Ser. No. 321,480
Int. Cl. F15b *20/00*
U.S. Cl. 60—403 **12 Claims**

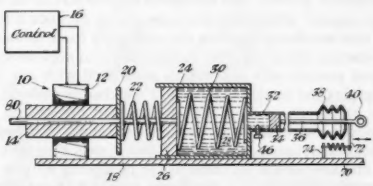


1. In a sawmill feedworks having a cylinder, a reciprocable piston disposed within said cylinder, a piston rod secured to said piston and extending outwardly from said cylinder, a carrier fixed to said piston rod and constructed to reciprocate and carry an external load in accordance with the movement of said piston, plural conduit connected to opposite ends of said cylinder, a reservoir and pump combination for supplying pressurized fluid to and exhausting fluid from said plural conduit, electrical circuit means for supplying electrical power to drive said pump, primary valving means operatively interposed between said plural conduit and said reservoir and pump combination for selectively introducing pressurized fluid therein and exhausting fluid therefrom to reciprocate said piston, and control means for operatively controlling the operative condition of said primary valving means: an improvement comprising gate valve means interposed in one of said plural conduit, said control means including safety means responsive to electrical power failure for automatically closing said gate valve means and wherein said control means comprises a sawyers lever, and linkage means intercoupling said sawyers lever with said primary valving means, said sawyers lever including said safety means.

3,877,226
ELECTRO-MECHANICAL ACTUATOR

Alvin S. Blum, 2350 Del Mar Pl., Fort Lauderdale, Fla. 33301

Filed June 18, 1973, Ser. No. 371,036
Int. Cl. F15b *13/16, 9/03*
U.S. Cl. 60—545 **8 Claims**



1. An electro-mechanical actuating device responsive to an electrical current for providing a uniform, longer duration actuating stroke comprising:

a solenoid;

an electrical current means coupled to said solenoid for actuating said solenoid armature;

a means connected to said armature for storing mechanical energy;

a fluid actuated linear motion translating means connected to said energy storage means for translating said stored energy received from said solenoid armature movement into uniform linear motion;

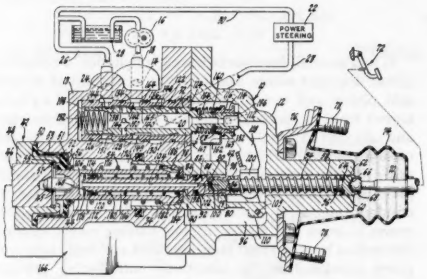
a connector means connected to said fluid actuated translating means.

3,877,227

SUPPORTED LINE PRESSURE POWER BRAKE ASSEMBLY

Michael Demido, Troy, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed May 3, 1974, Ser. No. 466,613
Int. Cl. F15b *7/00, 13/10*
U.S. Cl. 60—548 **2 Claims**



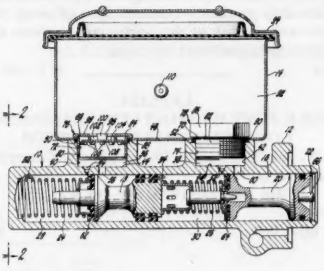
1. In a hydraulic power brake booster assembly having a housing with a pressure chamber therein and operator-actuated brake control means including a pedal rod means extending through said pressure chamber and a reaction piston, means including said reaction piston for producing sequential multistage reaction forces against said pedal in response to changes in pressurization in said pressure chamber comprising: said reaction piston being operably connected to said rod means to transmit reaction forces back to said pedal for providing the vehicle operator with a feeling of braking action; an elongated portion of said reaction piston extending into chamber means fluidly communicated with said pressure chamber and having surrounding wall means spaced from said elongated portion; said elongated portion having an end surface against which fluid pressure acts to produce a first level of reaction force opposing the operator's force on said pedal; a reaction sleeve member reciprocally mounted on said elongated portion with seal means associated with one end and engaging the surrounding wall of the chamber means to present an annular area acted upon by said pressurized fluid to produce a supplemental reaction force and a resultant second level of reaction force upon said pedal; spring means engaging at one end of said reaction sleeve producing a force thereon opposing movement of the sleeve caused by pressurized fluid acting on said seal means; said spring means being supported at the other end in a noncommunicating manner with respect to said pedal so as not to impose a force thereon; means on said reduction piston adapted to be engaged by the second end of said reaction sleeve after a predetermined movement of the reaction sleeve against said spring whereby upon engagement the supplemental reaction force is added to the first level of reaction force to produce a second level of reaction force in response to increased pressurization of said pressure chamber.

3,877,228

MASTER CYLINDER ASSEMBLY AND RESERVOIR FOR SAME

Ronald L. Shellhause, assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 19, 1974, Ser. No. 462,335
Int. Cl. F15b *7/08*
U.S. Cl. 60—585 **2 Claims**



1. A master cylinder reservoir arrangement comprising:

a master cylinder body having a first fluid reservoir chamber formed therein with an open top, a bottom provided with a compensation port, and a cylindrical side wall having an internally threaded section adjacent the open top;

a main fluid reservoir body defining a second fluid reservoir chamber having a side wall and a removable sealing top and a bottom, said bottom having an aperture therein positioned over said first fluid reservoir chamber and being at least as large as said first fluid reservoir chamber open top;

and means securing said main fluid reservoir body to said master cylinder body comprising a tubular member having an externally threaded section and a centrally apertured head section of greater diameter than said externally threaded section to provide a shoulder therebetween and a centrally apertured cap, said externally threaded section extending through said aperture and threaded into said internally threaded section of said first fluid reservoir chamber cylindrical side wall with said shoulder tightly engaging said second fluid reservoir chamber bottom to retain said main fluid reservoir body on said master cylinder body, said head section having a baffle plate adjacent thereto and mounted within the upper portion of said tubular member, said baffle plate having a plurality of apertures adjacent the outer periphery thereof and a solid center section in axial alignment with the aperture of said cap, said plurality of apertures being also positioned adjacent the inner wall of said tubular member externally threaded section to provide a tortuous fluid flow path between said second fluid reservoir chamber and said compensation port.

3,877,229

COMBUSTION MEANS FOR A LOW-POLLUTION ENGINE

Edwin L. Resler, Jr., Ithaca, N.Y., assignor to Cornell Research Foundation, Inc., Ithaca, N.Y.

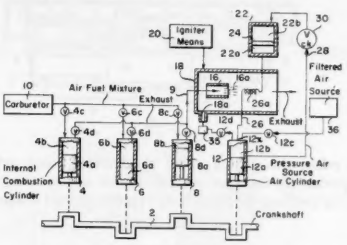
Continuation-in-part of Ser. No. 306,721, Nov. 15, 1972, abandoned. This application Feb. 4, 1974, Ser. No. 439,583
Int. Cl. F02g *1/00, 3/02*
U.S. Cl. 60—597 **38 Claims**

1. Combustion apparatus, comprising

a. internal combustion engine means operable in a fuel rich mode to produce exhaust gases rich in hydrocarbons and carbon monoxide and having a relatively low content of oxides of nitrogen;

b. a source of air;

c. mixing means for mixing the exhaust gases and the air to produce a fuel-to-air ratio near, and on the lean side of, stoichiometric; and



d. burner means for burning said mixture at about one atmosphere pressure to produce a flame having a temperature range of from about 2500° Rankine to about 3300° Rankine for a period of time to effect rapid substantially complete combustion of the hydrocarbon and carbon monoxide components without the formation of additional undesirable oxides of nitrogen.

3,877,230

PLURAL-CYLINDER INTERNAL COMBUSTION ENGINES EQUIPPED WITH AN EXHAUST DRIVEN TURBOCHARGER

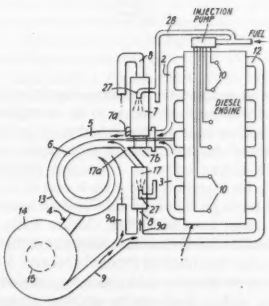
John Overy, Brentwood, and Michael John Broad, Enfield, both of England, assignors to Plessey Handel und Investments A.G., Zug, Switzerland

Filed July 12, 1973, Ser. No. 378,741

Claims priority, application United Kingdom, July 27, 1972, 35139/72

Int. Cl. F02b *37/00*

U.S. Cl. 60—606 **1 Claim**



1. A prime mover which comprises in combination: an internal-combustion engine including a plurality of cylinders each having an inlet and an exhaust outlet; a supercharger including a turbine having a plurality of nozzle groups respectively connected to the exhaust outlet of each cylinder or to the exhaust outlets of the cylinders of each of a plurality of groups into which the plurality of cylinders is divided, to respectively cause exhaust gases from each engine cylinder or group of engine cylinders to provide driving power for the turbine and permit the respective utilization of the discharge rhythm of such cylinder or group of cylinders, and a dynamic compressor driven by said turbine and having an inlet for combustion air and an outlet for compressed air, said outlet being connected to the inlets of all said cylinders; and a plurality of bypass lines each including an auxiliary combustion chamber and each connecting said compressor outlet to a different one of said individual nozzle groups of said turbine, in bypass to the cylinders of the engine.

3,877,231

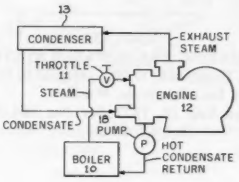
STEAM ENGINE SYSTEM AND PROCESS OF OPERATING THE SAME

Walter H. Tinker, P.O. Box C-97, Frankfort, Ohio

Filed July 5, 1974, Ser. No. 486,160

Int. Cl. F01k *9/00*

U.S. Cl. 60—654 **16 Claims**



1. The process of operating a steam engine, comprising the steps of:

a. exhausting expanded steam through a condenser when an exhaust port is opened during the drive stroke of the piston,

b. dispensing condensate from the condenser into a heat-exchanging means near the end of the drive stroke,

c. mixing the condensate with residual steam during the compression stroke of the piston to heat the condensate,

d. discharging the heated condensate to a boiler when the steam admission port is closed during the compression stroke of the piston, and

e. delivering steam from the boiler to the piston cylinder when the steam admission port is opened for the drive stroke of the piston.

3,877,232

PISTON ENGINE UTILIZING A LIQUEFIABLE GASEOUS FLUID

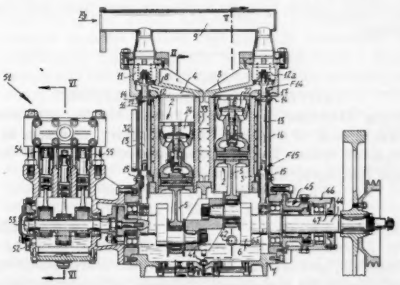
Jean-Pierre Girardier, Paucourt, and Philippe Parquet, Montargis, both of France, assignors to Sofretes-Societe Francaise d'Etudes Thermiques et d'Energie Solaire, Amilly, Loiret, France

Filed May 31, 1974, Ser. No. 475,257

Claims priority, application France, June 19, 1973, 73.22276

Int. Cl. F01k *11/00, 25/06*

U.S. Cl. 60—657 **23 Claims**



1. A piston engine utilizing a liquefiable gaseous fluid having lubricating properties in the liquid state and especially an engine actuated as a result of the expansion of a fluid vaporized under pressure within a system which operates with a low

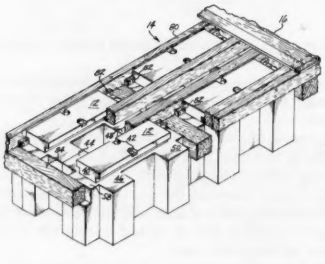
temperature difference, said engine being such as to comprise at least one piston slidably mounted within a cylinder in which is formed a work chamber and a crankshaft associated with the piston by means of a connecting-rod and rotatably mounted within a casing rigidly fixed to the cylinder, said cylinder being provided at least for the flow of the high-pressure fluid with an inlet which can be closed-off by means of a cyclic mechanism controlled by the rotation of the crankshaft, wherein provision is made at least within one of the zones of lubrication of the cylinder and of the cyclic mechanism for a fluid passage and cooling means combined with the said passage so as to cause condensation of the fluid therein.

3,877,233

FLOATING BREAKWATER SYSTEM

John O. Olsen, Lynnwood, Wash., assignor to Reid, Middleton & Associates, Inc., Edmonds, Wash.

Filed Aug. 28, 1972, Ser. No. 284,453
Int. Cl. E02b *3/06*
U.S. Cl. 61—5 **13 Claims**



1. A floating breakwater array to dissipate wave action in a body of water comprising a plurality of individual similarly shaped pontoon modules secured and held in the array by a network of structural members to collectively form a grid pattern of vertical walls and openings; said grid pattern having a plurality of regularly spaced openings in mutually transverse first and second horizontal directions of the array, and anchoring means connected to said array to secure it in a desired position in said body of water wherein said vertical walls and openings extend into the upper portion of the wave to interfere with the movement of fluid in the orbital flow under the wave crest; wherein said pontoon modules each comprise vertical walls which form a generally rectangular central portion having oppositely disposed protuberant end sections; said vertical walls also forming at least one protuberant side section which is located between said protuberant end sections and which extends laterally outwardly away from said central portion.

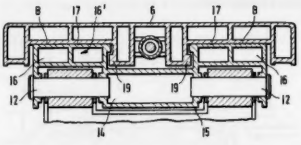
3,877,234

ADVANCEABLE SHIELD SUPPORT

Matyas Martinko, Varpalota; Ferenc Martos, and Karoly Hazai, both of Budapest, all of Hungary, assignors to Banyaszati Kutato Intezet Varpalotai Szenbanyak and Orszagos Banyagepgyarto Vallalat

Filed May 4, 1973, Ser. No. 357,325
Int. Cl. E21d *15/44*
U.S. Cl. 61—45 D **10 Claims**

1. Advanceable shield support apparatus, comprising a bottom sill, an overhead fall shield which is articulated to the goaf side of the bottom sill, hydraulic props supporting the overhead fall shield, a cradle-like bed supported by said props, a sliding guide mechanism being supported by said cradle-like bed, a roof cap coupled to the overhead fall shield at its seam-facing front end and supported by said sliding guide mechanism, the roof cap being longitudinally displaceable in its entirety on the cradle-like bed relative to the overhead fall shield leaving the shield free of engagement with the ceiling of



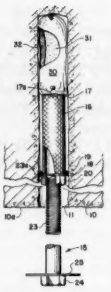
the mine, the sliding guide mechanism being articulatedly supported by the overhead fall shield, and means for advancing the roof cap in its entirety relative to said cradle-like bed.

3,877,235

ANCHOR BOLT ASSEMBLY AND UTILIZATION

David H. Hill, Clarksburg, W. Va., assignor to West Virginia Bolt Inc., Clarksburg, W. Va.

Filed Nov. 28, 1973, Ser. No. 419,644
Int. Cl. F21d *20/02*
U.S. Cl. 61—45 B **20 Claims**

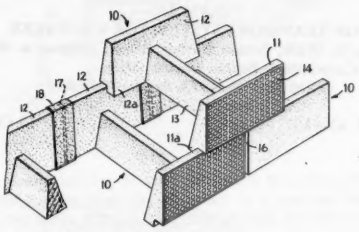


1. A roof bolting assembly for mounting in position within a bore hole of a mine roof that is to be strengthened which comprises, a hollow pipe anchor member of a shorter length than the depth of the bore hole, a destructible capsule that contains quick-setting adhesive resin and catalyst-hardener resin materials for insertion into a back end of the bore hole, a headed bolt having a threaded stem and an associated wide-face bearing plate, front and back closure walls at opposite ends of said anchor member, a threaded nut secured to a front end of said anchor member to rotatably receive a back end of said threaded stem therein, said bolt being initially limited in its positioning within said nut by endwise-abutment of the back end of said stem against said front closure wall, said anchor member and said bolt as assembled in the defined manner being adapted to be endwise-inserted and rotatably advanced within the hole until said back closure wall engages and fractures said capsule and mixes and distributes the resin material content thereof within the bore hole from its back end and forwardly along said anchor member, sealing means carried by said anchor member for preventing the mixed resin material from advancing along the bore hole beyond said front closure wall, said mixed resin material being adapted to quickly set within the bore hole and to thereby non-rotatably secure said anchor member therein, and said stem of said bolt being thereafter adapted to be turned within said nut to fracture and penetrate said front closure wall and advance relative to and within said anchor member until said bolt is drawn-up and tensioned to hold said bearing plate in tight engagement with the front face of the roof about the bore hole therein.

3,877,236
CRIB BLOCK AND STRUCTURE

Raymond J. O'Neill, 11 Chippewa Rd., Yonkers, N.Y., and George David Newell, 119 Helene Rd., Valley Cottage, N.Y. 10989

Filed Oct. 5, 1973, Ser. No. 403,776
Int. Cl. E02d *5/00*
U.S. Cl. 61—47 **10 Claims**



1. A structural unit for use in the construction of cribbing, retaining walls and the like with other similar units in a stacked relationship, each unit comprising two massive, rigid, laterally spaced side panels disposed extending axially parallel to each other, the panels defining a space therebetween open at opposite ends of the panels, a massive rigid connecting arm of lesser height than the panels disposed extending between opposed inner surfaces of the side panels and integral therewith holding the two side panels in relative fixed positions, said panels and said arm each have a generally trapezoidal cross section, and having opposite sides, including an inner side diverging inwardly in a direction toward a lower end of said unit, interlock means extending downwardly on lower edges of said unit for extending downwardly adjacent upper marginal surfaces of an upper edge of the panels of an immediately underlying structural panel for thereby interlocking two of the structural units when superposed, said interlock means comprising a downwardly extending portion of said connecting arm extending downwardly below a lower surface of each panel, and comprising a lip on each panel extending downwardly from the inner surface of the corresponding panel, said lip being disposed for extending downwardly adjacent an upper inner marginal surface of an upper edge of a panel of an immediately underlying structural panel thereby interlocking the structural units.

3,877,237
UNDERWATER TRENCHING APPARATUS GUIDANCE SYSTEM

Robert M. Norman, Lafayette, La., assignor to Norman Offshore Services, Inc., New Orleans, La.

Division of Ser. No. 175,448, Aug. 27, 1971, abandoned. This application Aug. 1, 1973, Ser. No. 384,886
Int. Cl. E02f *5/02, 5/14;* **F16l** *1/00*
U.S. Cl. 61—72.4 **18 Claims**

1. An underwater trenching apparatus for burying pipeline and the like beneath the bottom of a body of water comprising:

a frame for positioning over the pipeline to be buried,

jet means carried by the forward end of said frame,

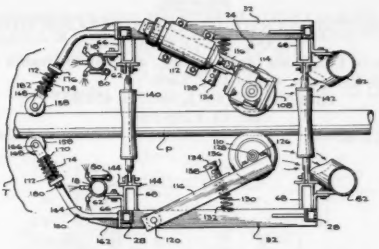
to dig a trench for the pipeline,

power means to move said apparatus along said pipeline,

said power means being mounted on said frame for contact with said pipeline,

guide means for sensing the direction of the pipeline in front of said apparatus and applying a torque for correcting the alignment of said apparatus, said guide means being secured to said frame forwardly of said power means,

whereby upon said guide means sensing a preselected magnitude of change in pipeline direction relative to the axis of said

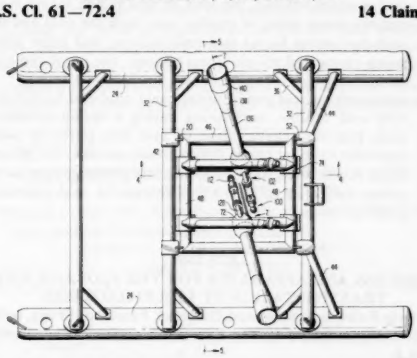


apparatus, a torque is applied to said apparatus to align the apparatus with said pipeline.

3,877,238
SEA SLED FOR ENTRENCHING AND PIPE BURYING OPERATIONS

Nuke Ming Chang, and Elmer R. Remkes, both of Orange, Calif., assignors to Santa Fe International Corporation, Orange, Calif.

Filed Nov. 6, 1973, Ser. No. 413,378
Int. Cl. E02f *5/02, 3/88;* **F04f** *5/00*
U.S. Cl. 61—72.4 **14 Claims**



1. A sea sled for use in excavating a trench below a pipeline laid along the sea bottom and for removing the slurry formed by the excavation comprising:

a base structure, means carried by said base structure for excavating the trench and including a plurality of jet nozzles directed to flow high pressure fluid below the pipeline to fluidize the sea bottom and form a slurry, means and carried by said base structure for removing the slurry including a conduit having an inlet disposed below said base structure and a discharge, a pump nozzle having an inlet external to said conduit and exposed to the ambient fluid, said pump nozzle having an outlet within said conduit for delivery of fluid to said conduit intermediate said inlet and discharge, a primary nozzle external to said conduit and spaced a predetermined distance from said pump nozzle inlet, and means for supplying fluid under pressure to said primary nozzle, said primary nozzle being disposed to flow the supply fluid toward said pump nozzle inlet across the space therebetween to entrain ambient fluid and deliver the entrained fluid and at least a portion of the supply fluid through the pump nozzle into said conduit whereby the combined flow through said pump nozzle causes slurry to flow through said conduit inlet into said conduit and delivery of the slurry, the supply

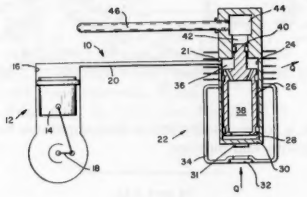
fluid portion, and entrained fluid to the conduit discharge.

3,877,239

FREE PISTON CRYOGENIC REFRIGERATOR WITH PHASE ANGLE CONTROL

Bruno S. Leo, Santa Monica, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Mar. 18, 1974, Ser. No. 452,033
Int. Cl. F25b *9/00*
U.S. Cl. 62—6 **4 Claims**



1. A cryogenic refrigerator comprising:

a pulse tube, means for cyclically generating a refrigerant gas pressure pulse in said pulse tube;

a free piston expander comprising a cylinder having a cold end and a warm end, a free piston mounted in said expander cylinder to separate said cylinder into a cold volume and a warm volume, the area of said piston facing said warm volume being of smaller area than the cold end of said free piston facing said cold volume, said pulse tube being connected to said warm volume, the improvement comprising:

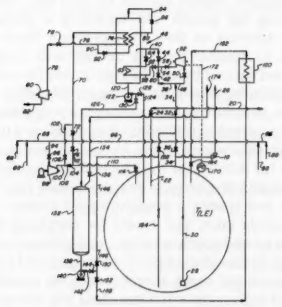
a spring urging said piston toward said cold end to reduce said cold volume, said spring having a spring constant such that the reciprocation of said free piston in said expander cylinder has an optimum substantially 90° phase angle relationship with respect to refrigerant gas pressure pulses delivered to said warm volume by said pressure pulse tube.

3,877,240

PROCESS AND APPARATUS FOR THE STORAGE AND TRANSPORTATION OF LIQUEFIED GASES

Ludwig Kniel, Scarsdale, and Frederick Fussman, Bronx, both of N.Y., assignors to The Lummus Company, Bloomfield, N.J.

Filed Apr. 27, 1973, Ser. No. 354,925
Int. Cl. F17c *7/02*
U.S. Cl. 62—50 **39 Claims**



1. A process for the re-liquefaction of a gas evolved from a first liquefied gas stored at about atmospheric pressure in a first cryogenic tank means proximate to a second cryogenic tank means storing a second liquefied gas at about atmospheric pressure wherein the first liquefied gas has a boiling point higher than said second liquefied gas which comprises:

a. withdrawing a gas from said first cryogenic tank means;

b. withdrawing a gas from said second cryogenic tank means; and

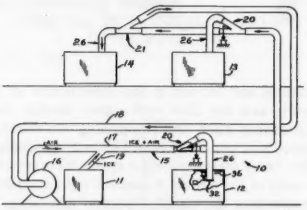
c. passing said gases in indirect heat transfer relationship therebetween to liquefy the gas withdrawn from said first cryogenic tank means.

3,877,241

AIR TRANSPORT SYSTEM FOR ICE MAKER

Charles H. Wade, Benton Harbor, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed May 10, 1973, Ser. No. 359,059
Int. Cl. F25c *5/00*
U.S. Cl. 62—137 **17 Claims**



9. In an apparatus having a storage bin for storing ice bodies remotely of an ice body maker, the improvement comprising: a diverter device adjacent said storage bin; means for flowing a fluid from the remote ice body maker to said diverter device for transporting ice bodies thereto from said ice body maker; and means for temporarily retaining the ice bodies adjacent said storage bin, said diverter device defining a branched duct having an inlet portion receiving the flowing fluid and transported ice bodies, a first outlet leg leading to said retaining means, and a second outlet leg leading to a fluid delivering position, and control means including a foraminous baffle for selectively directing ice bodies entering said inlet portion to either of said outlet legs, said foraminous baffle causing said flowing fluid to apply a static fluid pressure to said first leg when said control means is directing the flowing fluid and ice bodies to said second leg and said retaining means is arranged to retain said ice bodies.

3,877,242

HARVEST CONTROL UNIT FOR AN ICE-MAKING MACHINE

Olen R. Creager, Fresno, Calif., assignor to International Refrigeration Engineers

Filed Oct. 11, 1973, Ser. No. 405,295
Int. Cl. F25c *1/06, 1/12*
U.S. Cl. 62—138 **7 Claims**

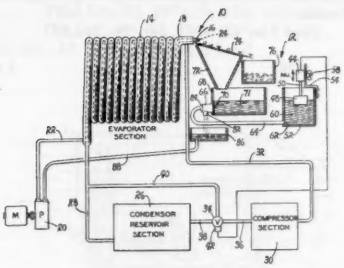
1. An improved harvest control unit in combination with an ice-making machine of the type including an ice-making tube, means for delivering a continuous flow of water through said tube at a variable rate, and a hot-gas circuit including means responsive to an electrical harvesting signal for initiating ice-harvesting operations, comprising:

A. a receiver pan for receiving water delivered through said tube;

B. a holding tank disposed in spaced relation with said receiver pan for confining a relatively warm body of water having a variable level;

C. a float switch connected with said holding tank for providing an electrical harvesting signal in response to a predetermined variation in the level of said body;

D. a manifold chamber connected in free-flow communication with the lower portions of said receiver pan and said holding tank; and



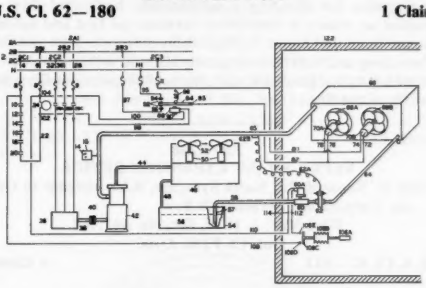
E. means defining in said manifold a metering orifice for discharging from the chamber, at a substantially fixed rate, water delivered thereto from said pan and from said holding tank.

3,877,243

REFRIGERATION SYSTEMS INCLUDING EVAPORATOR WITH 2 SPEED FAN MOTOR

Daniel E. Kramer, 2009 Woodland Dr., Yardley, Pa. 19067

Filed Sept. 27, 1973, Ser. No. 401,265
Int. Cl. F25d *17/00*
U.S. Cl. 62—180 **1 Claim**



1. An improved refrigeration system having conduit connected compressor, condenser (**46**), restrictor (**62**), and evaporator (**66**); first motor (**36**) connected to the compressor for driving it, said first motor having energized and deenergized conditions; a fan (**68A**), positioned to blow air over the evaporator (**66**); a second motor (**70A**) connected to said fan for driving it, said second motor adapted to operate at higher voltage-higher speed, lower voltage-lower speed; first conductor means (**82**) connected to said second motor for supplying electric power to it; wherein the improvement comprises; second conductor means (**97**) adapted for connection to a higher voltage power supply (**2B3**); third impedance-free conductor means (**95**) adapted for connection to a lower voltage power supply (**N1**); switch means (**92, 94, 96**) connected to first conductor means (**82**), second conductor means (**97**) and third conductor means (**95**), adapted to provide electrical contact between said first conductor means (**82**) and alternately second conductor means (**97**) and third conductor means (**95**), said switch means (**92, 94, 96**) being operatively connected to establish essential correspondence between

a. the energized condition of the first motor (**36**) and the electrical contact between the first conductor means (**82**) and the second conductor means (**97**) to cause the second motor to operate at higher speed, and

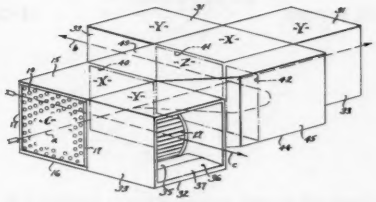
b. the deenergized condition of the first motor (**36**) and electrical contact between the first conductor means (**82**) and the third conductor means (**95**) to cause the second motor to operate at lower speed.

3,877,244

MODULAR DRY-AIR EVAPORATIVE COOLER

Leonard J. Di Peri, 18325 Lahey St., Northridge, Calif. 91324

Filed June 11, 1973, Ser. No. 368,756
Int. Cl. F28d *5/00*
U.S. Cl. 62—314 **23 Claims**



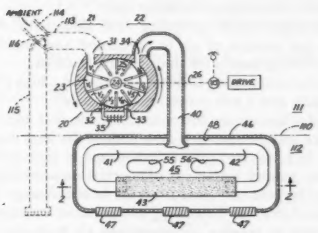
1. A dry-air evaporative cooler including: a pair of spaced side members and a core means having opposite interfaces separating the space between said members into two angularly related air passages with wetting means at one interface engaging a primary evaporative column of air and with the other interface engaging a secondary sensible cooled column of air with heat transfer between said opposite interfaces, the remaining two pairs of opposite sides between said members being open therebetween for said angularly related movement of said separate columns of air, and both said separate columns of air being moveable through said two angularly related passages coextensively between the said spaced members.

3,877,245

AIR CONDITIONER HAVING TEMPERING AND MOISTURE CONTROL MEANS

Thomas C. Edwards, Casselberry, Fla., assignor to The Rovac Corporation, Maitland, Fla.

Filed Nov. 30, 1973, Ser. No. 420,712
Int. Cl. F25d *17/04*
U.S. Cl. 62—317 **17 Claims**



1. In an air conditioning system for use in a warm ambient, the combination comprising a compressor-expander having an output port for producing a stream of supercooled air having finely divided ice particles entrained therein, means coupled to the output port and defining a vent, a filter element interposed in the stream between the output port and the vent and of such mesh as to collect substantially all of the ice particles while allowing the cold dry air to pass through to the vent, thermal transmission means coupled to the ambient for transmitting heat therefrom to the filter to melt the ice particles collected therein, means for draining from the filter the collected moisture, and means associated with the vent for mix-

ing the cold dry air in predetermined proportion with ambient air to form a tempered mix which is discharged from the vent.

3,877,246

AIR-CONDITIONING FOR AIRCRAFT CABINS

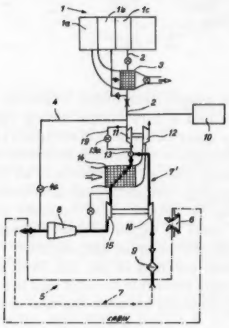
Horst Schutze, Leeste, Germany, assignor to Vereinigte Flugtechnische Werke-Fokker GmbH, Bremen, Germany

Filed July 15, 1974, Ser. No. 488,517

Claims priority, application Germany, July 18, 1973, 2336500

Int. Cl. F25d *9/00*

U.S. Cl. 62—402 **21 Claims**



1. A system for climate control, heating and air conditioning of an aircraft cabin, comprising:

first means for providing pressurized air;

a first decompressing turbine having a high pressure input side and a low pressure output side;

heat exchange means including first flow path defining means for passage of air to be cooled and second flow path defining means for passage of a coolant;

a second decompressing turbine, also having a high pressure input side and a low pressure output side;

flow conduction means for connecting the first and second turbines and the said first flow path of the heat exchange means in series and to the first means in such a manner that the second turbine is connected downstream from the first turbine as well as from the heat exchange means; a precipitator for removing precipitated moisture and connected to receive decompressed air from the output of the second turbine, air flowing from the precipitator into the aircraft cabin;

second means including cleaning filter means for drawing air from the cabin;

a compressor driven by one of the turbines and connected to the second means for compressing cleaned air as drawn from the cabin;

a mixing stage included in the conduit means and connected for receiving the air as compressed by the compressor; and

a bleeder valve for maintaining a particular pressure in the cabin, so that not all of the air entering the cabin from the precipitator is returned through the filter.

3,877,247

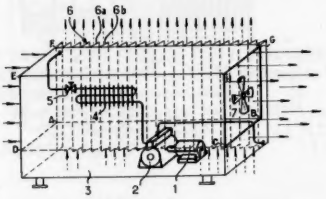
AIR-CONDITIONING APPLIANCE SETTING UP A DOUBLE AIR CIRCULATION

George Henry Le Couturier, Palaiseau, France, assignor to Soges (Societe Generale d'Economie et de Service), Montlucon, France

Filed May 23, 1973, Ser. No. 362,897

Int. Cl. F25b *39/04*

U.S. Cl. 62—428 **1 Claim**



1. In a room having a vertical wall, a transportable air conditioning appliance comprising cold generator means including a condenser, an evaporator, means for circulating a refrigerant fluid through said condenser and said evaporator, a case having first and second substantially vertical larger faces the length of which is substantially longer than their height, the condenser being arranged along said first face and including vertically extending fins outwardly projecting from said first face the evaporator being housed inside the case between said first and second larger faces and a fan cooperating with the evaporator for directing a substantially horizontal flow of cooled air which is channelled between the first and second larger faces, and means for removably positioning the said first face along and substantially parallel to said wall at a predetermined distance from said wall, the said distance equalling the width of the fins.

3,877,248

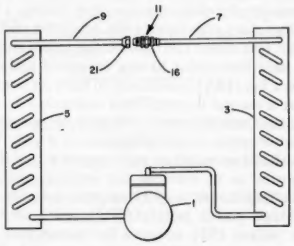
REFRIGERANT EXPANSION DEVICE

Fred V. Honnold, Jr., North Syracuse, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Mar. 1, 1974, Ser. No. 447,461

Int. Cl. F25b *41/06*

U.S. Cl. 62—511 **4 Claims**



1. In a compression refrigeration system including a compressor, a condenser and an evaporator connected in a refrigeration circuit, a refrigerant expansion device for expanding refrigerant flowing from the condenser to the evaporator, said refrigerant expansion device comprising:

an elongate body portion having a planar surface generally perpendicular to the direction of refrigerant flow; and

an expansion conduit commencing at said planar surface and extending through said body portion said conduit having a cylindrical bore of uniform diameter;

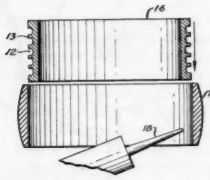
the length of said conduit being from 5 to 12 times the diameter of said conduit.

3,877,249

ECONOMICAL STRETCHABLE PRECIOUS-METAL RINGS HAVING ENCLOSED ANNULAR VOIDS

Bert W. Sager, Highland Park, Ill., assignor to Paramount Wedding Ring Co., Inc., Chicago, Ill.

Filed Feb. 22, 1974, Ser. No. 444,828
Int. Cl. A44c 9/00
U.S. Cl. 63—15 4 Claims



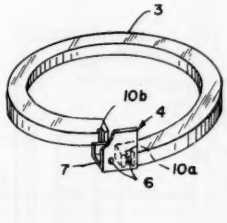
1. A precious-metal ring having concealed within its body, for saving metal while retaining good stretchability characteristics, narrow steep-sided enclosed annular voids separated by annular rib means, the rib means reinforcing the ring against collapsing when stretching it to enlarge its size by providing, with annular continuity, metal from outer to inner faces of the ring.

3,877,250

LOCKING RING FOR JEWELRY

Robert G. Musillo, 5481 Wolfe Dr., Pittsburgh, Pa. 15236

Filed July 26, 1973, Ser. No. 382,927
Int. Cl. A44c 25/00
U.S. Cl. 63—23 3 Claims



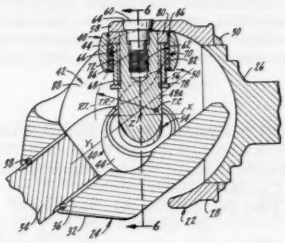
1. For use in combination with an endless chain for forming a bracelet or necklace, a locking ring looped through a link of said chain for connecting it to a charm or the like, said locking ring being split at one portion to form two adjoining ends, a transverse narrow groove adjacent each end of said locking ring and extending along only an outer peripheral portion thereof, a connecting tab of thin, flat material bent into substantially U-shape with one leg longer than the other, said ends of said locking ring being normally offset before locking, one of said tab legs having indentations thereon forming interior projections, means connecting said tab to said locking ring with one of said projections projecting into one of said grooves, whereby after the other end of said ring is brought into end-to-end relationship with said one end, the leg of longer length of said connecting tab may be bent to completely surround the end portions of said ring and securely lock them together.

3,877,251

UNIVERSAL JOINT SYSTEM

Gunnar A. Wahlmark, Dixon, Ill., assignor to Wahlmark Systems, Inc., Chicago, Ill.

Filed June 15, 1973, Ser. No. 370,408
Int. Cl. F16d 3/30
U.S. Cl. 64—21 10 Claims



1. In a constant velocity universal joint of the three-roller type including a trunnion member having three trunnions each carrying an axially shiftable drive roller and also including a track member having three drive tracks confining and controlling the axial positions of the drive rollers on the respective trunnions, with the rollers disposed in driving engagement with drive surfaces in the respective drive tracks, the improvement comprising two-way antifriction bearing means rotatably and axially shiftably mounting said rollers on the respective trunnions, whereby said antifriction bearing means provide totally antifriction support for said rollers as they rotate and shift axially on said trunnions to accommodate relative weaving of the axes of said members when the joint is rotated with the axes of the members angularly disposed, each of said bearing means including:

a. inner and outer annular bearing races formed on the respective roller and trunnion, and

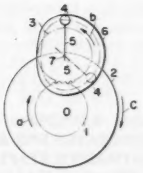
b. a plurality of spherical antifriction members annularly disposed in rolling preloaded bearing fashion between said inner and outer races and arranged to accommodate both rotation and axial shifting of said roller on said trunnion by rolling of said spherical antifriction members between said races.

3,877,252

CENTRIFUGAL TORQUE CONVERTER

Saburo Kobayashi, 465, 3-chome, Sekiyata-cho, Niigata-shi, Japan

Filed Apr. 29, 1974, Ser. No. 465,257
Int. Cl. F16d 5/00
U.S. Cl. 64—25 7 Claims



1. A centrifugal torque converter comprising axially aligned input and output members; a transmission plate substantially in the form of disc fixedly connected at its center to an end of said output member and disposed in a plane perpendicular ot the axis of said output member, said transmission plate having at least one deformed circular aperture provided therein apart from the axis line of said output member, said at least one aperture containing one shaft disposed eccentrically therein

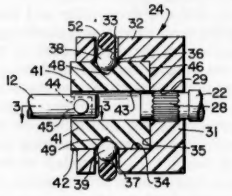
and extending therethrough in a direction parallel to the axis line of said output member, said shaft being driven at its one end by said input member through any suitable means, said shaft having a centrifugal weight mounted thereon to be slidable in a direction normal to said shaft and to rotate by the rotation of said shaft while contacting with the inner surface of said aperture, so that the distance from said shaft to the center of gravity of said weight changes with the rotation of said weight, whereby the input torque supplied to the input member is amplified and transmitted to said output member by said centrifugal weight when the velocity ratio between the input and the output member is greater than 1:1.

3,877,253

SLIP CLUTCH ASSEMBLY FOR TORQUE LIMITING DRIVE FOR HUMIDIFIER ROTORS AND THE LIKE

Richard J. Yeagle, Hartland, Mich., assignor to Skuttle Manufacturing Company, Milford, Mich.

Filed Dec. 1, 1972, Ser. No. 311,415
Int. Cl. F16d *3/38*
U.S. Cl. 64—29 **4 Claims**



1. A slip clutch assembly comprising inner and outer clutch members adapted to be connected between drive and driven devices, each of said clutch members being an integral synthetic plastics unit, the outer of said clutch members having a cylindrical bore, the inner of said clutch members having an external cylindrical surface smoothly slidably telescoped within said bore for rotatably mounting said inner clutch member directly within said outer clutch member, an external annular groove on said outer clutch member, a plurality of angularly spaced outwardly open sockets on the external surface of said inner clutch member, a motion transmitting connection between said clutch members comprising radially movable balls seated in said sockets and extending within corresponding openings in the bottom of said groove during normal drive conditions, and a resilient annulus consisting of an integral ring of synthetic plastics material in said groove for retaining said balls against displacement from said sockets under normal drive conditions but permitting said balls to be displaced out of said sockets to interrupt the motion transmitting connection between and permit relative rotation of said clutch members under torque conditions in excess of a predetermined amount.

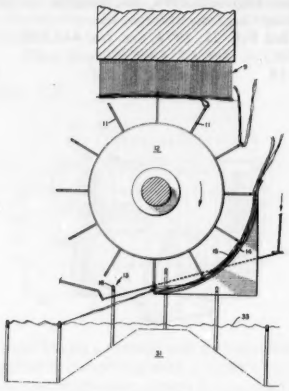
3,877,254

METHOD AND APPARATUS FOR KNITTING FABRIC FROM UNTWISTED STAPLE FIBERS

Richard L. Walford, Bloomfield, N.J., assignor to J. P. Stevens & Co., Inc., New York, N.Y.

Filed July 30, 1973, Ser. No. 383,856
Int. Cl. D04b *9/12*
U.S. Cl. 66—9 B **6 Claims**

1. In a process of producing a knit fabric by knitting substantially untwisted, linear material the fibers of which are substantially parallel oriented, the improvement which comprises forming the substantially untwisted and substantially parallel fibers of the linear material into overlapping hairpin-shaped loops, conveying said loops and feeding them to the needles of a knitting machine, the feeding of the overlapping



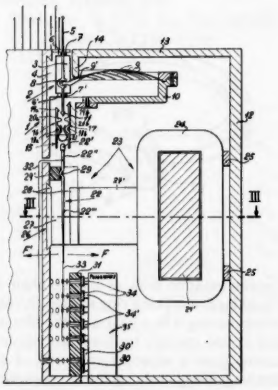
hairpins to the needles substantially transverse to the front of the needles.

3,877,255

NEEDLE-CONTROL MECHANISM FOR CIRCULAR KNITTING MACHINE

Guido Allavena, Milan, Italy, assignor to Semitex AG, Vaduz, Liechtenstein

Filed Mar. 26, 1973, Ser. No. 345,190
Claims priority, application Italy, Mar. 25, 1972, 22378/72; June 14, 1972, 25664/72; Mar. 2, 1973, 21119/73
Int. Cl. D04b *9/00, 15/78*
U.S. Cl. 66—13 **13 Claims**



1. In a circular knitting machine, in combination:
a cylinder mounted for rotation about its axis;
a set of needles distributed over a peripheral surface of said cylinder, said needles extending generally in the direction of said axis and being axially oscillatable between a retracted position and an extended position;
actuating means on said cylinder individual to each needle for oscillating same between said retracted and extended positions;

stationary cam means adjacent said cylinder coacting with said actuating means upon rotation of said cylinder;

mechanism on said cylinder individual to each needle for controlling the oscillation thereof by said actuating means, said mechanism including a selector element displaceable between several discrete positions including a first position wherein said actuating means operatively couples the associated needle with said cam means and a second position wherein said actuating means effectively decouples the associated needle from said cam means; and

at least one presetting station adjacent said cylinder provided with programming means effective upon passage of said selector element through said station to place the selector element in any of said discrete positions, said presetting station comprising a generator of a steady magnetic field intersecting the path of said selector element, the latter being electrically conductive and connectable at said station in an energizing circuit for the passage of a direct current therethrough under the control of said programming means with resultant displacement of said selector element from one of said discrete positions to another in a sense depending on the polarity of said direct current.

3,877,256

KNITTING METHOD AND APPARATUS UTILIZING CYLINDER AND DIAL NEEDLES

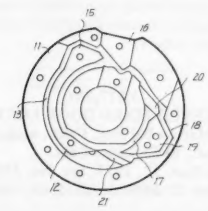
Ramon Masriera Roque, Calle San Esteban, 53, Malgrat de Mar, Barcelona, Spain

Continuation-in-part of Ser. No. 117,001, Feb. 19, 1971, abandoned, which is a continuation of Ser. No. 761,201, Sept. 20, 1968, abandoned. This application Mar. 2, 1973, Ser. No. 337,706

Claims priority, application Spain, Sept. 22, 1967, 345787

Int. Cl. D04b *9/22*

U.S. Cl. 66—24 **16 Claims**



1. In a circular knitting machine, cylinder needle means extending parallel to the axis of a needle cylinder and sinker means coacting with said cylinder needle means for knitting yarn fed thereto, dial needle means extending substantially radially with respect to said axis and being longitudinally movable, and control means coacting with said dial needle means for displacing the latter to a plurality of positions one of which is an operating position where said dial needle means coact with said cylinder needle means for forming rib knitting therewith, said dial needle means including a number of dial needles equal to one half the number of cylinder needles of said cylinder needle means, and said cylinder needle means when coacting with said dial needle means having every other cylinder needle displaced to an inactive position, while the remainng operative half of the number of cylinder needles coact with said dial needles for forming rib knitting therewith, and said dial needle means also coacting with said remaining operative half of the number of cylinder needles for transferring knitting thereto, said cylinder needles which are in said inactive position remaining in said inactive position during transfer of knitting from said dial needles to said operative half of the number of cylinder needles so that said cylinder needles which are in said inactive position do not participate in the transfer of knitting from said dial needles to said cylinder needles, said cylinder needle means and dial needle means respectively having parallel axes of rotation which are spaced from each other and said cylinder needle means and dial needle means respectively providing for said cylinder needles and dial needles circular paths of movement which are closest to each other at a transfer station where knitting is transferred from said dial needles to said cylinder needles and which are spaced at the greatest distance from each other at a stitch forming station opposed to said transfer station.

3,877,257

ANNULAR CAM BOXES OF CIRCULAR KNITTING MACHINES

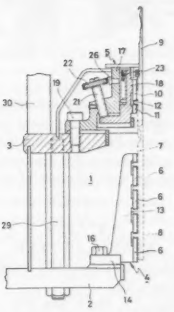
Jose Maria Dalmau Guell, Badalona, Spain, assignor to Jumberca, S. A., Badalona (Prov. of Barcelona), Spain

Filed Nov. 20, 1973, Ser. No. 417,506

Claims priority, application Spain, Nov. 20, 1972, 408792; Nov. 20, 1972, 408793

Int. Cl. D04b *15/32, 15/68*

U.S. Cl. 66—50 R **4 Claims**



1. In a circular knitting machine of the type having selector jacks, selectable needles, and an annular cam box having a lower operative region mounted on the lower base ring of the machine structure and having cams actuating the selector jacks, and an upper operative region mounted on the upper base ring of the machine structure and having cams actuating the selected needles, the improvement comprising each of said operative regions comprising a base ring and a plurality of column type cam carrying support members independent from one another and demountably attached to said base ring, said support members being positioned equidistantly around the periphery of said base ring and projecting outwardly therefrom.

3,877,258

APPARATUS FOR CONTROLLING THE AUTOMATIC SELECTION OF SINKERS IN CIRCULAR KNITTING MACHINES

Pavel Uhlir, Trebic, Czechoslovakia, assignor to Zavody textiliniho strojirenstvi, generalni reditelstvi Elitex, Liberec, Czechoslovakia

Filed Oct. 13, 1972, Ser. No. 297,388

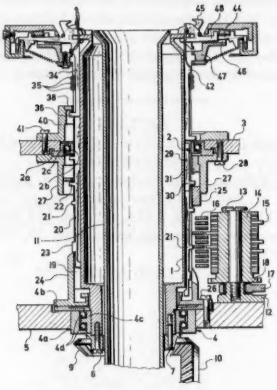
Claims priority, application Czechoslovakia, Oct. 14, 1971, 7212-71

Int. Cl. D04b *15/06*

U.S. Cl. 66—93 **12 Claims**

1. A circular knitting machine comprising a rotary cylinder, having a plurality of axial grooves, a plurality of needles mounted for axial movement in said cylinder, a plurality of associated ground loop sinkers and plush loop sinkers mounted in a sinker ring, each of said plush loop sinkers having an operative edge for forming plush loops, each of said

sinkers being associated with a respective one of said needles and movable horizontally into an operative position in cooperation with said associated needle to catch the yarn laid therein, patterning means having a predetermined program for determining selected ones of said plush loop sinkers to be



moved into operative position and means associated with each plush loop sinker for transmitting said program to said selected sinkers for controlling their horizontal movement, at least a portion of said means for transmitting said program being located within an axial groove of said needle cylinder.

3,877,259

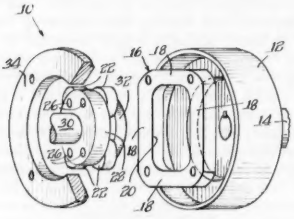
SHAFT COUPLER

Bernard Frank Bishop, Chicago, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Mar. 27, 1973, Ser. No. 345,299

Int. Cl. F16d *3/56*

U.S. Cl. 64—29 **5 Claims**



1. A coupler device for coupling a drive shaft and a driven shaft, means providing a structure presenting a plurality of yieldable beam members adapted to be supported by and rotatable with one of said shafts, the extremities of said beam members being secured on said one of said shafts against any movement along the respective longitudinal axes of said beam members, the inner surfaces of said beam members being uniformly oriented circumferentially about and spaced from the axis of said supporting shaft so as to define a non-circular opening of straight surfaces extending between corner areas for accommodating a plurality of rotary coupling members, a plurality of circumferentially spaced rotary coupling members positioned within said opening, and mounting means rotatable as a unit with said other shaft for positioning each of said rotary coupling members in engagement with the inner surface areas of two adjacent beam members in said corner areas of said yieldable beam members whereby to provide a flexible coupling between said shafts.

3,877,260

MACHINE FOR OPERATING ON AN ARTICLE OF LEATHER OR SKIN

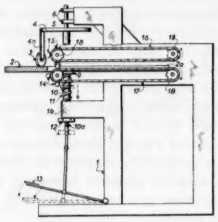
Franck Finiels, Place F. Bompaire, 12100, Millau-Aveyron, France

Filed Dec. 18, 1973, Ser. No. 425,832

Claims priority, application France, Dec. 19, 1972, 72.46262

Int. Cl. C14d *1/40*

U.S. Cl. 69—33 **10 Claims**



1. Apparatus for operating on articles of leather or skin comprising support means for an article to be worked on, a pair of tools for gripping the article therebetween to work the article, means for driving the tools along respective closed paths at the same speeds, said paths being in part coextensive and said tools traveling in the same direction thereat with the article disposed therebetween such that the tools operate on the article from the center thereof towards its edges, and means for alternately clamping the article onto the support means when the tools operate on said article and for rotating the article on the support means when the tools have left said article in order to present a different portion of the article to said tools in a subsequent pass thereof along said coextensive paths, said means for alternately clamping and rotating the article on the support means comprising rollers resting on the article on said support means, and means urging said support means against said rollers.

3,877,261

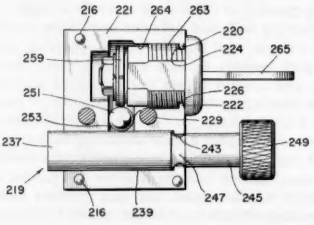
KEYED FIXED DOOR LOCK

Milton Robins, Marina Del Rey, Calif., assignor to Packaging Techniques, Inc., El Segundo, Calif.

Filed Mar. 12, 1973, Ser. No. 340,283

Int. Cl. E05b *65/08, 9/06, 9/08*

U.S. Cl. 70—90 **24 Claims**



22. A device for prohibiting relative movement between two otherwise relatively movable elements comprising

a housing mountable upon one of said members,

a rod slidable through said housing including,

a first section having one diameter and extending from said housing for cooperation with a predrilled bore in a second relatively movable fixture,

a second section having a second, relatively smaller diameter, and

fillet means between said first and second sections for cooperation with an inhibiting means,

means cooperating with said first section of said rod for limiting the movement of said rod through said housing in one direction,

means cooperating with said second section of said rod for limiting the movement of said rod through said housing in the other direction,

means in said housing for inhibiting axial movement of said rod relative to said housing, and

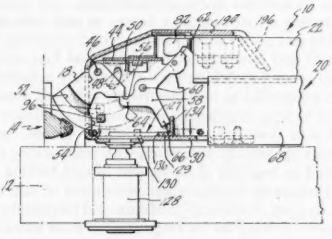
cam means in said housing for selectively actuating said inhibiting means into operative relationship with said rod means to positively prohibit such relative axial movement.

3,877,262

EMERGENCY EXIT LATCH AND ACTUATOR ASSEMBLY

Merton S. Williams, Terryville, Conn., assignor to Emhart Corporation, Bloomfield, Conn.

Filed Sept. 20, 1973, Ser. No. 399,277
Int. Cl. E05b *65/10*
U.S. Cl. 70—92 **30 Claims**



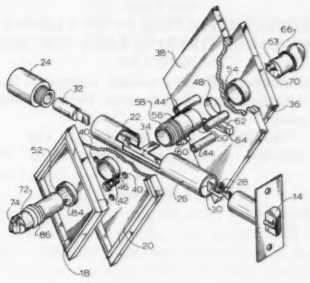
1. An emergency exit latch and actuator assembly comprising an elongated frame adapted to be secured to the inner face of an outwardly opening door to extend transversely thereof, a latch bolt supported on said frame for pivotal movement between projected and retracted positions, a retractor element supported on said frame for pivotal movement about an axis parallel to the axis of said latch bolt between first and second positions and including first and second parts, said first part being engageable with an associated part of said latch bolt to move said latch bolt from its projected to its retracted position in response to movement of said retractor element from its first position to its second position, said latch bolt being movable from its projected to its retracted position independently of said retractor element and with said associated part out of engagement with said first part, an elongated first actuating member having an actuator part engageable with said second part, links supporting said first actuating member for simultaneous arcuate movement toward and away from the door and translation in a generally longitudinal direction relative to said frame between an inactive and active position, said actuator part being engageable with said second part when said retractor element is in its first position to pivot said retractor element from its first to its second position in response to the movement of said first actuating member from its inactive to its active position.

3,877,263

DOOR HANDLE ASSEMBLY

Tom Gilmore Strickler, III, and William Allen Hays, Jr., both of 500 Broadway Bldg., St. Louis, Mo. 63102

Filed Sept. 5, 1973, Ser. No. 394,608
Int. Cl. E05b *47/02, 63/22*
U.S. Cl. 70—149 **7 Claims**



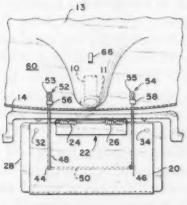
1. Latching apparatus for controlling latching and release of a door relative to a door frame, comprising a latch member disposed in the door and being normally disposed in latching relation within a latch receiving recess in the door frame, said latch member being mounted for sliding movement toward and away from the latch-receiving recess and being connected to electrical latch control means, at least one handle member mounted for sliding movement in the opening direction of the door and including a shaft element which is mounted substantially normal to said latch member, said shaft element including a lug portion extending radially therefrom for engagement with a switch in said door which is connected in a control circuit with the electrical latch control means in order to withdraw the latch member from the latch-receiving recess of the door frame when the handle member is moved in the opening direction of the door to cause the lug portion of said shaft element to contact the switch and complete the control circuit.

3,877,264

ANTI-THEFT LICENSE PLATE FASTENER

Joseph A. Foglietti, 2411 Commercial St., Mingo Junction, Ohio 43938, and Joseph N. De Franco, 132 Parkdale Rd., Steubenville, Ohio 43952

Filed May 3, 1974, Ser. No. 466,801
Int. Cl. B60r *25/00*
U.S. Cl. 70—237 **14 Claims**



1. A device for preventing unauthorized access to the fuel tank filler opening of the motor vehicle comprising:

a. a license plate holder,

b. hinge means for pivotally attaching said holder to the body of the motor vehicle,

c. cable means fastened to said holder at a point spaced from said hinge means, and

d. means for securing a portion of said cable means within a locked compartment of a motor vehicle to thereby prevent the rotation of said holder such that the fuel tank filler opening is exposed.

3,877,265

THEFT PROTECTION DEVICE WITH CYLINDER LOCK, PARTICULARLY STEERING LOCK FOR MOTOR VEHICLES

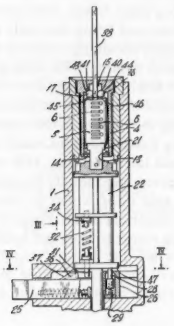
Guenter Schaumberg, Radevormwald, Germany, assignor to Societe d'Exploitation des Brevets Neiman, Neuilly-sur-Seine, France

Filed Feb. 4, 1974, Ser. No. 439,158

Claims priority, application Germany, Feb. 28, 1973, 2309867

Int. Cl. E05b *65/12*

U.S. Cl. 70—252 **5 Claims**



1. In a theft protection device with a cylinder lock comprising a lock cylinder core which is locked in the parking position in a lock cylinder housing which can be turned in said lock cylinder housing after axial displacement while in said parking position by the full insertion of a key for said device, said device having a controller cylinder coupled to said lock cylinder core in alignment therewith which controller cylinder is engageable by a latch in the parking position and which latch can be disengaged after axial displacement of said lock cylinder core and controller cylinder by revolution of said lock cylinder core and controller cylinder in a driving position, said latch held disengaged in a stop position by said controller cylinder and, in the unlocked position, is held in the disengaged position by said controller cylinder until said controller cylinder is axially displaced toward the key entrance, the improvement comprising a spring means on which said lock cylinder core is mounted and which urges said cylinder core in axial displacement when the key is withdrawn, spring means longitudinally mounted within said controller cylinder carrying a protruding tongue which tongue engages in unlocked position a cam on said latch whereby to hold said latch in disengaged position, said spring means biasing said controller cylinder whereby disengagement of said tongue from said cam urges said controller cylinder axially toward the key entrance when the key is withdrawn and effects disengagement of said latch with said controller cylinder.

3,877,266

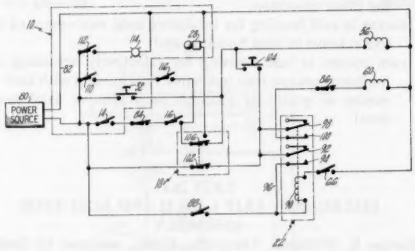
TWO-KEY LOCKING SYSTEM

John D. McLaughlin, Raleigh, N.C., assignor to Ellock International, Inc., Raleigh, N.C.

Filed Mar. 28, 1974, Ser. No. 455,750

Int. Cl. E05b *47/02*

U.S. Cl. 70—280 **12 Claims**



1. An electrical key-actuated security locking system comprising a control area; a remote secure area including an access closure movable between open and closed positions; a power source; a locking member associated with said closure and movable between a locked condition and an unlocked condition to permit movement of said access closure into and out of its closed position; locking and unlocking circuits including electrically actuated means for driving said member between its locked and unlocked conditions; said unlocking circuit including a first switching means at said control area connected to said power source and a second switching means in series with and remotely located from said first switching means, said second switching means being key-actuated and electrically connected to said electrically actuated means for driving said locking member to its unlocked condition upon closing of said first and second switching means; holding circuit means operatively associated with said locking circuit and activated in response to movement of said locking member to said unlocked condition and movement of said access closure to an open position to condition said electrically actuated means for driving the locking member to its locked condition upon return of said access closure to said closed position; and a security switch controlling the operation of said holding circuit means and being adapted to interrupt both said locking and unlocking circuits to secure said secure area by preventing key-actuated operation of said locking member, said security switch being operatively controlled from the interior of said secure area.

3,877,267

SIDE BAR LOCK AND KEY MECHANISM

George A. Harris, Jr., 811 Malaga Dr., Boca Raton, Fla. 33432

Continuation of Ser. No. 97,714, Dec. 14, 1970, abandoned. This application Jan. 29, 1973, Ser. No. 327,514

Int. Cl. E05b *15/14, 19/18, 27/06*

U.S. Cl. 70—358 **15 Claims**

1. A lock comprising:

A. A first member;

B. A keyway extending along said first member;

C. A plurality of channels intersecting said keyway;

D. A second member, said first and second members being movable relative to each other between a locked position and an unlocked position; and

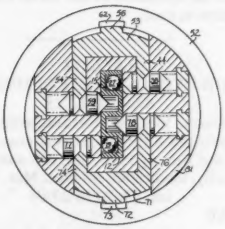
E. A plurality of substantially identical control means to control relative movement between said first and second members, each of said control means comprising;

1. a first tapered end surface;

2. a second tapered end surface,

3. a control surface intermediate said end surfaces and dividing said control means into first and second por-

tions, each of said first portions having one identical length and each of said second portions having a second identical length greater than said length of each of said first portions, each of said control means being movably located within a respective one of said chan-



nels to be actuated by a key inserted into said keyway, said lock being coded according to whether said first end surface or said second end surface of selected ones of said control means face toward or away from said keyway.

3,877,268

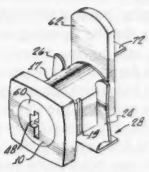
LOCK ASSEMBLY WITH RESILIENT LATCH

Paul H. Shull, Orange, Calif., assignor to Elixir Industries, Gardena, Calif.

Filed Feb. 1, 1973, Ser. No. 328,767

Int. Cl. E05b *15/04, 15/14*

U.S. Cl. 70—364 R **9 Claims**



1. A lock assembly comprising a housing cylinder having a bore and a radially inwardly facing longitudinally extending groove formed therein,

a retainer cylinder mounted for rotation in said bore and formed with a radially outwardly facing recess,

a resilient latch assembly having a first portion secured to one of said cylinders and a second portion detachably secured to the other of said cylinders to thereby lock said retainer cylinder against rotation within the bore of said housing cylinder, said resilient latch assembly comprising an elongated flat spring element having first and second end sections captured within said housing cylinder groove and having an intermediate section offset from said end sections and detachably captured within the recess of said retainer cylinder,

means for selectively releasing the engagement of said second portion of said resilient latch assembly from engagement with the other of said cylinders,

said means for releasing the engagement of said second portion of said resilient latch assembly comprising a dog mounted to said retainer cylinder for movement radially thereof and having an outer portion thereof in contact with said intermediate section of said spring element, and means for shifting said dog radially outwardly of said retainer cylinder to move said intermediate section of said spring element out of said recess and thereby allow relative rotation of said retainer cylinder within the bore of said housing cylinder.

3,877,269

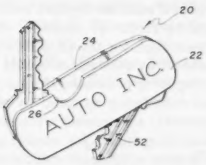
KEY HOLDER

Guy K. Dehart, 4493 Camile, Salt Lake City, Utah 84117

Filed Nov. 12, 1973, Ser. No. 415,260

Int. Cl. A47g *29/10*

U.S. Cl. 70—456 R **6 Claims**



1. A key holder comprising:

a first rigid side being centrally bent toward a second side;

a second rigid side being centrally bent toward the first side, at least one of the first and second sides being temporarily deformable and having mechanical memory the first and second sides defining an unobstructed space and converging at their ends so as to provide a localized frictional restraint;

a dowel centrally disposed and permanently affixed to each of the first and second sides for holding at least one point on the first side in fixed spatial relation with a point on the second side, the dowel having a first greater axial dimension;

key retaining pins mounted transversely between the sides near each end thereof, each pin being rigidly attached to one of the sides and unattached to the other so that the pin will become spaced from the other side sufficiently to admit a key when a separating force is exerted upon at least one of the sides the pins having a second lesser axial dimension so as to permit the sides to converge at their ends and impinge upon the key in localized frictional restraint.

3,877,270

ROLLING MILL INCLUDING MEANS FOR COMPENSATING FOR ROLL BENDING

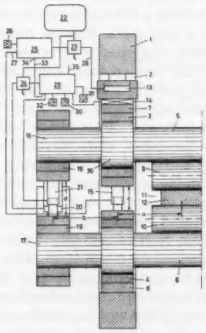
Hans-Friedrich Marten, Kreuztal, Germany, assignor to Schloemann-Siemag Aktiengesellschaft

Filed Dec. 28, 1973, Ser. No. 429,424

Claims priority, application Germany, Dec. 30, 1972, 2264333

Int. Cl. B21b *37/00*

U.S. Cl. 72—8 **9 Claims**



1. In a rolling mill having a housing and a pair of rolls between which is formed a roll gap,

said pairs of rolls having bearing chock assemblies mounted on their ends received in said housing,

position indicating means arranged between at least one of said cooperative opposed pair of bearing chock assemblies and capable of producing a signal representing the distance between said cooperative opposed pair of bearing chock assemblies,

at least one of said rolls having free ends which are subject to roll bending forces of hydraulic roll bending piston cylinder assemblies, for the purpose of compensating for at least some of the deflections of said one roll caused by the separating force generated by said rolls during rolling. one of said rolls being adjusted by an hydraulic piston cylinder assembly screwdown arranged in said housing,

a pressure detecting means for producing a signal proportional to the separating force, which signal is received by a control means,

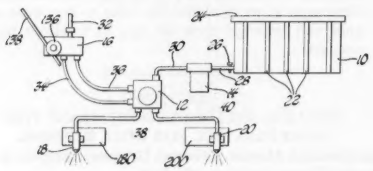
means for connecting said control means with said roll bending piston cylinder assemblies in a manner that the forces of said roll bending and screwdown piston cylinder assemblies are maintained in a desired proportional relationship relative to variations of t'.e separating force, and said control means receiving said distance signal and producing a control signal for effecting an operation of said screwdown to maintain substantially constant the distance between said cooperative opposed pair of bearing chock assemblies.

3,877,271

LUBRICANT DISPENSING MEANS AND SYSTEM

Edwin A. Maddock, 1510 Cherokee, Royal Oak, Mich. 48067

Division of Ser. No. 101,880, Dec. 28, 1970, Pat. No. 3,759,424. This application Jan. 11, 1973, Ser. No. 322,733
Int. Cl. B21j *3/00*
U.S. Cl. 72—23 **2 Claims**



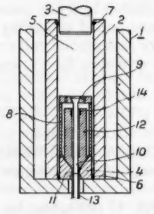
1. A lubricating spray system for use with metal forming presses and including a positive displacement fluid pump, a source of air under pressure connected to said pump for operation thereof, a source of lubricating fluid connected to said pump, a plurality of flow nozzles connected to said pump for receiving and dispensing a lubricating spray therethrough, said pump comprising a one piece housing member having two contiguous chamber area spaces of respectively larger and smaller diametric size formed therewithin and from one end thereof, inlet and outlet passage means for viscous fluid formed in communication with said smaller chamber area space and having inlet and outlet check valves disposed respectively within the inner ends thereof, an intermediate member received and retained within said larger chamber area space and forming an end wall for both of said chamber area spaces and an abutment wall retentive of said check valves in said inlet and outlet passage means, passage means provided at opposite ends of said larger chamber area space for selective alternate communication with an air pressure supply source and an atmospheric vent, a differential piston member having its larger end received and guided within said larger chamber area space and its smaller end received and guided through said intermediate member and into said smaller chamber area space for inducing fluid flow thereinto and therefrom, and a cover member for closing the open end of said housing and having adjustable means provided therethrough and into said larger chamber area space for limiting the travel of the larger end of said differential piston member and thereby the volumetric induction and displacement of fluid by its smaller end within said smaller chamber area space, and operative means in the connection between the air pressure source and the pump for cyclic control of the pump in accord with the operation of the metal forming press with which the system is used.

3,877,272

METHOD FOR HYDROSTATIC EXTRUSION OF TUBES AND BILLETS

Gunnar Brunosson, Vasteras, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed Feb. 8, 1974, Ser. No. 440,874
Claims priority, application Sweden, Mar. 7, 1973, 7303176
Int. Cl. B21d *23/04*
U.S. Cl. 72—60 **10 Claims**



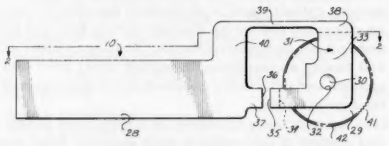
1. A method for the hydrostatic extrusion of tubes which comprises inserting into a pressure chamber having a die opening and a mandrel passing through the die opening and of less diameter than the die opening a billet having a central hole therethrough and having a bore at the rear end, and a sleeve in said bore formed of a material which is harder than the material of the billet and has a larger inner diameter than the diameter of the mandrel, the sleeve having a greater thickness of material than the space between the die opening and the mandrel and being substantially shorter than the billet, thereby to prevent the billet from being completely pressed out of the die opening.

3,877,273

GEAR ROLLING METHOD AND APPARATUS

Irven H. Culver, Playa Del Rey, Calif., assignor to Southwestern Industries, Inc., Los Angeles, Calif.

Filed Aug. 31, 1973, Ser. No. 393,500
Int. Cl. B21h *5/02*
U.S. Cl. 72—108 **37 Claims**

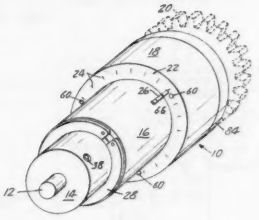


1. In the cold rolling of finished gear teeth in a virgin surface of a rotatable metal gear blank by forceful engagement of the virgin surface by the circumference of an appropriately arranged and profiled rotatable forming roll, the improvement comprising establishing the desired tooth forming engagement of the roll with the blank progressively over several rotations of the blank from an initial engagement force sufficient in view of the initial contact area to produce inelastic deformation of the blank material but of magnitude substantially less than the desired engagement force.

3,877,274
TORQUE METER

Robert L. Wahlstedt, Minneapolis, Minn., assignor to Reel Precision Manufacturing Corporation, St. Paul, Minn.

Filed Mar. 25, 1974, Ser. No. 454,479
Int. Cl. G01l *3/02*
U.S. Cl. 73—136 A **6 Claims**



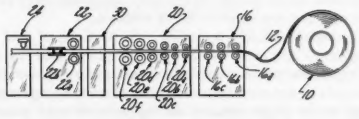
1. A device adapted to serve as a torque meter, comprising, in combination: driving means for connection to a source of power; driven means for connection to a load whose resistance to torque is to be measured; said driving and driven means being in axial alignment and including axially adjacent cylindrical surfaces of identical diameter; deflectable coil spring means connecting said driving and driven means for establishing a measurable deflection dependent on said load; releasable lock means, comprising a spiral spring overlying said surfaces and fixed at one end to one of said surfaces, for maintaining said deflection; and readout means for determining the extent of said deflection.

5. A torque meter adapted for determining maximum torque under steady state dynamic conditions, comprising; coaxial drive means for connection to a source of power and driven means for connection to a load whose resistance to torque is to be measured; deflectable spring means connecting said drive and driven means for establishing a measurable angular deflection therebetween dependent on said load; overrunning clutch means coaxial with said drive and driven means, affixed to one of said means and disposed in freely rotating relationship with the other of said means; lock means carried by said other means for releasably locking said clutch means thereto; and readout means for determining the extent of said deflection.

3,877,275
COLD ROLL REDUCTION AND FORMING METHOD

James W. Attwood, Wayne, Mich., assignor to Unistrut Corporation, Wayne, Mich.

Filed Aug. 22, 1973, Ser. No. 390,619
Int. Cl. B21b *1/12*; **B21d** *5/08*
U.S. Cl. 72—177 **31 Claims**



1. A method of preparing flat stock for subsequent forming to a cross-sectional shape having a bend along a prelocated corner line, comprising:

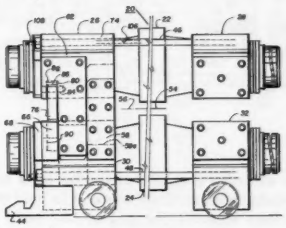
a. providing flat stock of known hardness which normally will not bend to such shape without risk of cracking, either during bending or in subsequent use; and

b. cold reducing said stock to diminished thickness while simultaneously raising from one face thereof a ridge and impressing a depression in the opposite side of said stock, said ridge and said depression extending on a line corresponding in location to the corner line of the to-be-formed shape flat surfaces of said stock extending from each side of said ridge.

3,877,276
MILL ROLL CHANGING SYSTEM INCLUDING A CANTILEVERED ROLL ASSEMBLY

Andrew J. Petros, Oakdale, Pa., assignor to Mesta Machine Company, Pittsburgh, Pa.

Filed Dec. 28, 1973, Ser. No. 429,344
Int. Cl. B21b *31/08*
U.S. Cl. 72—238 **22 Claims**

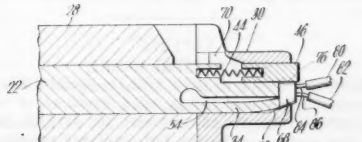


1. A mill roll assembly comprising a first mill roll, a first bearing chock rotatably mounted adjacent one end of said first roll, a second mill roll disposed generally above said first mill roll, a second bearing chock rotatably mounted adjacent one end of said second mill roll and disposed generally above said first bearing chock, and joining means mounted entirely and normally permanently on said bearing chocks for detachably joining said second bearing chock to said first bearing chock so that said second bearing chock and in turn said second mill roll are supported entirely from said first bearing chock in cantilevered fashion whereby said roll assembly can be inserted and withdrawn relative to a stand of said mill while the assembly is so supported without removing strip or the like from the mill stand.

3,877,277
EXTRUSION TOOL

Daniel Eppler, Toms River, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.

Filed June 14, 1974, Ser. No. 479,431
Int. Cl. B21c *23/00*
U.S. Cl. 72—259 **14 Claims**

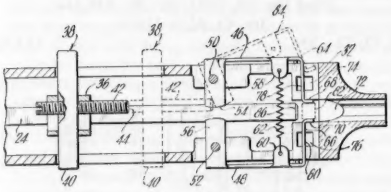


1. Plunger means for use in connection with an extrusion tool or the like comprising: a generally elongate first plunger portion having a first end and a recessed portion extending rearwardly from said plunger portion first end; a second plunger portion slidable generally longitudinally on said first plunger portion recessed portion and having a first end and a second end; and biasing means cooperative with said first plunger portion and said second plunger portion for biasing said second plunger portion first end selectively forward of said first plunger portion first end.

3,877,278
SELECTIVE DISPENSING MECHANISM

Daniel Eppler, Toms River, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.

Filed June 18, 1974, Ser. No. 480,478
Int. Cl. B21c 33/00
U.S. Cl. 72—270 13 Claims



1. In an extrusion tool of the type having a body portion, plunger means reciprocatingly movable in paid body portion, a nose portion adjacent one end of said body portion and having an orifice for receiving one end of said plunger means therein to extrude a connector through said orifice, the improvement comprising: a first arm having a first end and a second end; a second arm having a first end and a second end, each of said first and said second arms being pivotably coupled adjacent opposite sides of said body portion for movement towards and away from said body portion; biasing means cooperative with said first and said second arms for maintaining said first end of each of said first and said second arms in selectively spaced opposing relationship in a first position generally adjacent said nose portion orifice; said body portion having a first and a second connector receiving aperture, said apertures being disposed on opposite sides of said nose portion orifice and communicating therewith, each of said first and said second arms providing a blockage between a respective one of said first and said second connector receiving apertures and said nose portion orifice in said first position, each of said first and said second arms being selectively and independently movable to a second position providing access between a respective one of said first and said second connector receiving apertures and said nose portion orifice; and cam means cooperative with said plunger means for movement therewith, said cam means being selectively positionable to engage and move a selective one of said first and said second arms from said first position to said second position upon selective movement of said plunger means.

3,877,279
SHEET METAL BRAKE

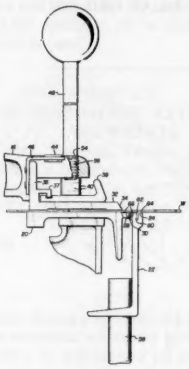
Eugene H. Van Cleave, Redford, Mich., assignor to Van Mark Products Corporation, Detroit, Mich.

Continuation of Ser. No. 302,141, Oct. 30, 1972, abandoned. This application May 13, 1974, Ser. No. 469,506
Int. Cl. B21d 5/04
U.S. Cl. 72—319 3 Claims

1. In a brake for bending a workpiece, said brake having a frame, a support member secured thereto, clamping means exerting a force for holding a workpiece to said support member, and a bending member having a lateral working surface, said bending member hinged to said support member, the improvement comprising:

an elongated slot extending into said bending member along the length of said bending member, and opening onto said lateral working surface, said slot bounded by parallel side walls; and

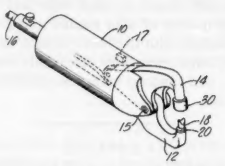
an elongated resilient member of generally L-shaped cross-section having a first leg disposed in said slot and having a second leg overlying the lateral working surface of said bending member to be interposed between the working surface and said workpiece to prevent damage to the workpiece.



3,877,280
TOOL FOR FORMING CRIMP JOINTS

Jack J. Cornell, Orange, Calif., assignor to Angeles Metal Trim Co., Los Angeles, Calif.

Filed Oct. 30, 1973, Ser. No. 410,986
Int. Cl. B21d 31/02
U.S. Cl. 72—325 8 Claims



1. In a crimping tool of the type comprising a cylindrical punch and a cooperating die having a cylindrical cavity, and wherein said die and punch are mounted for pivotal movement relative to one another to cause said punch to enter said cavity in coaxial relation thereto to crimp together a pair of superposed metal sheets previously disposed between said punch and die, the improvement wherein:

spaced diametrically opposing side portions of said punch adjacent the end of the punch facing said cavity are shaped to define a pair of arcuately curved surfaces,

said pair of arcuately curved surfaces each being inclined at an acute angle relative to the axis of said punch and relative to an axis perpendicular to said first mentioned axis, said surfaces converging toward one another to intersect one another at an arcuate cutting edge, each said surface being of crescent shape,

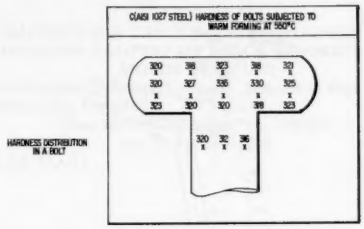
the opposing ends of said arcuate cutting edge terminating at the outer cylindrical periphery of said punch to define a pair of spaced punch points disposed respectively at the extremities of said arcuate cutting edge, said arcuate cutting edge being concavely curved substantially the entire length thereof from one said punch point to the other.

3,877,281

METHOD FOR PRODUCING A HIGH STRENGTH BOLT

Kiyoshi Shimizu; Toshihiro Minami, both of Kobe, and Eiji Niina, Nishinomiya, all of Japan, assignors to Kobe Steel, Ltd., Kobe, Japan

Filed Sept. 4, 1973, Ser. No. 394,134
Claims priority, application Japan, Oct. 27, 1972, 47-107774
Int. Cl. B21k 1/46
U.S. Cl. 72—364 10 Claims



1. A method for producing a high strength bolt from a carbon steel or a low alloy steel material, comprising the steps of:

subjecting said material to cold working at a reduction-of-area percentage of 10 percent and over;

rapidly heating said material thus worked to a temperature range from 450°C to the A_1 transformation point and at a rate of at least 50°C/min.;

warm-forming said material to a bolt shape; and

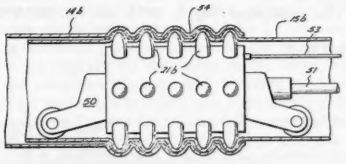
air cooling said material or cooling said material at a cooling rate higher than that of said air cooling, said cooling rate being at least 50°C/min.

3,877,282

SWAGING TOOL FOR JOINING TWO TELESCOPIC PIPE ENDS

Ivo C. Pogonowski, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Division of Ser. No. 247,584, April 26, 1972, Pat. No. 3,795,035. This application Sept. 28, 1973, Ser. No. 401,776
Int. Cl. B21d 41/02
U.S. Cl. 72—393 3 Claims



1. A swage for sealing together two telescopic pipe ends having a longitudinal axis comprising,

a. roller supported swage block means in the telescopic pipe ends,

b. a plurality of rows of pistons operable in cylinders, each row having a plurality of pistons mounted for movement in a radial direction from said pipe longitudinal axis,

c. telescopic arm means for moving said roller supported swage block means longitudinally in the pipes and rotatably about the pipe longitudinal axis,

d. means for actuating said pistons in said cylinders for forming depressions in the two pipes, and

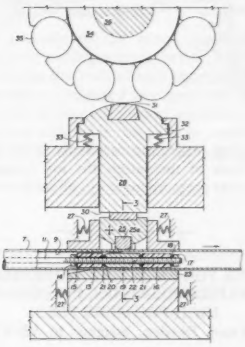
e. said piston actuating means being responsive to said telescopic arm means for forming parallel rows of depressions through the pipe ends around the internal periphery of the pipes to seal the pipe ends together.

3,877,283

WELD BEAD-REDUCING APPARATUS

Francis R. Hohl, Union; Arthur L. Meyer, Jr., Kendall Park, and Robert W. Faust, Mantoloking, all of N.J., assignors to Carpenter Technology Corporation, Reading, Pa.

Filed Aug. 21, 1973, Ser. No. 390,312
Int. Cl. B21j 7/04, 7/28
U.S. Cl. 72—398 8 Claims



1. Internal weld bead-reducing apparatus for flattening the internal bead formed in welded tubing, comprising an elongated mandrel, means for feeding the tubing along said mandrel with the latter extending longitudinally within the tubing, an elongated anvil having a maximum transverse diameter substantially less than the interior diameter of said tubing and less than the distance between the weld bead in said tubing and the opposite interior surface of said tubing, means positioning said anvil on said mandrel while leaving said anvil free to move a predetermined amount longitudinally along and transversely to said mandrel whereby said anvil is free to move both longitudinally and radially with respect to said tubing between the weld bead and the opposite surface of the tubing, a hammer assembly including a hammer and means supporting the same along one side of said mandrel for moving said hammer to impact the tubing and force a portion of the bead on the interior thereof into beadreducing contact with said anvil.

3,877,284

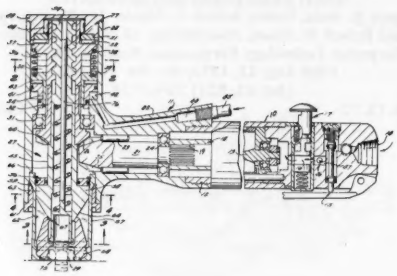
CRIMPING MECHANISM IN A NUT RUNNER

Lester A. Amtsberg, Utica, and William K. Wallace, Barneveld, both of N.Y., assignors to Chicago Pneumatic Tool Company, New York, N.Y.

Division of Ser. No. 121,867, March 8, 1971, Pat. No. 3,747,441. This application May 9, 1973, Ser. No. 358,821
Int. Cl. B21j 13/02
U.S. Cl. 72—402 3 Claims

1. A lever for crimping a side face of a nut, comprising a body of general triangular form having a base wall, front and back walls extending upwardly from the base wall and terminating in a rounded vertex end, a rounded heel connecting the lower end of the back wall with the base wall, the heel being adapted for pivotal support in a complementary pocket of a holding sleeve, a crimping toe at the lower end of the front wall adjacent the base wall adapted for effecting a crimp in a side face of a nut that might be positioned in front of the toe as a consequence of a rearward pivoting of the lever, the

rounded vertex end having a portion of its curvature projecting forwardly of the front wall, the projecting curvature being adapted to present a bearing surface to a relatively moving



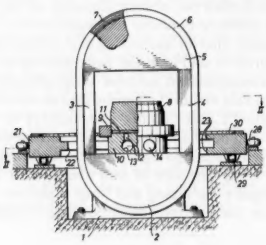
wedge, and a lug projecting forwardly from the front wall between the ends of the latter, the lug being adapted for engagement under pressure means to effect a forward pivoting of the lever.

3,877,285

MACHINE FOR TREATING WORKPIECES AT ELEVATED PRESSURES, ESPECIALLY A HIGH-PRESSURE PRESS

Sten Trolle, Ystad, Sweden, assignor to AB Carbox, Ystad, Sweden

Filed Aug. 20, 1973, Ser. No. 390,173
Claims priority, application Sweden, Aug. 28, 1972, 11124/72
Int. Cl. B23p *11/00*
U.S. Cl. 72—429 **10 Claims**



1. A machine for treating workpieces at elevated pressures, comprising:

movable workpiece treating means mounted to a frame;

a power-driven large mass annular fly-wheel surrounding said movable workpiece treating means and frame and having a radially internal wall;

means supporting said fly-wheel at its periphery for rotation in a substantially horizontal plane;

cam means on said radially internal wall of said fly-wheel; and

means operatively coupling said cam means of said fly-wheel with said movable workpiece treating means to impart operating movement thereto;

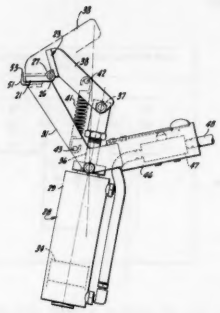
said supporting means supporting said fly-wheel at a low level relative to said frame so that reactional forces generated each time the workpiece treating means is operated via said cam means are transmitted to said frame at or near its center of gravity, thereby reducing tilting effects on the frame during operation of the machine.

3,877,286

CLOSER FOR SHEET METAL LOCKS

Raymond L. Fontaine, 6301 Holstein Way, Sacramento, Calif. 95822, and Gary R. Fontaine, 7280 Los Rior Dr., Carmichael, Calif. 95608

Filed Aug. 12, 1974, Ser. No. 496,480
Int. Cl. B21d *19/02*
U.S. Cl. 72—450 **8 Claims**



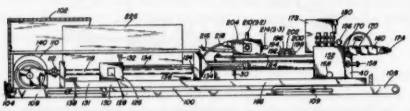
1. A closer for sheet metal locks having a substantially U-shaped cross-section with an inner leg, an outer leg parallel thereto, and an intermediate leg joining said inner and outer legs approximately at right angles thereto comprising a stationary plate having a first edge and adapted to abut said intermediate leg, a movable plate having a second edge and adapted to abut said outer leg, a hinge connecting said stationary plate and said movable plate together for relative swinging movement about an axis parallel to said first and second edges, an actuating mechanism including a cylinder and a piston reciprocable therein, means for connecting said cylinder to one of said plates, means for connecting said piston to the other of said plates, and means on said stationary plate opposite said first edge for engaging said inner leg.

3,877,287

LOW FLOW GAS OR LIQUID CALIBRATOR

John L. Duntz, Jr., Gulf Breeze, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Continuation of Ser. No. 229,052, Feb. 27, 1972, abandoned.
This application Aug. 9, 1973, Ser. No. 387,090
Int. Cl. G01f *25/00*
U.S. Cl. 73—3 **11 Claims**



1. Calibration apparatus comprising:

a base

a fluid impervious precision bore tube having a known inner diameter mounted on said base, said tube being adapted to contain a fluid:

a piston disposed within said tube and movable to force fluid out of said tube;

a piston rod having one end connected to said piston;

a micrometer screw rotatably mounted on said base;

a slider block slidably engaging said base and mounted on said screw and connected to the other end of said piston rod;

means for preventing rotation of said slider block whereby each revolution of said screw moves slider block a known linear distance;

a motor connected to said screw for rotating said screw at a preset velocity and thereby causing said slider block and said piston to move linearly at a constant velocity; and

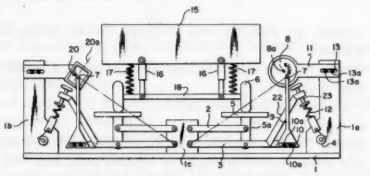
means operatively cooperating with the piston rod movement for measuring the velocity of said piston and thereby the flow rate of the fluid being forced out of said tube.

3,877,288

MACHINE FOR CHECKING EFFECTIVENESS OF VIBRATION DAMPERS OR SHOCK ABSORBERS ON MOTOR VEHICLES

Alfred Schiefen, Windeck, Germany, assignor to Boge GmbH, Eitorf, Sieg, Germany

Filed Mar. 9, 1973, Ser. No. 339,879
Int. Cl. G01m *17/04*
U.S. Cl. 73—11 **5 Claims**



1. A device for checking the effectiveness of vibration dampers associated with the wheels of a vehicle while on a vehicle, comprising: fixed frame support means; a wheel platform on which the wheel rests while still on the vehicle; a pair of generally horizontal parallel control levers pivotably connected at one of their ends to the frame means and pivotably connected to the wheel platform to support said platform for vertical oscillation; drive means for vibrating the wheel platform vertically to thus stimulate the mass of the wheel into co-vibration and hence operate the vibration dampers; spring means resiliently interconnecting the drive means and the wheel platform; and a recording means for recording the amplitude of the vibrations of the wheel platform, said recording means including a stylus operatively connected to the upper end of a stylus support member carried by and upstanding from one only of said levers, whereby the stylus moves over an arcuate path having a radius extending from said stylus to the pivotal connection of said one lever to said frame means, a recording medium carried by the frame and positioned to be engaged by the stylus as the latter moves to record the vibrations thereon, said recording medium being mounted for movement in a direction transversely of the path of said stylus, and means for adjustably connecting the lower end of the stylus support member to said one lever and adjustably connecting said recording medium to the frame for varying the starting position of the stylus on the recording medium.

3,877,289

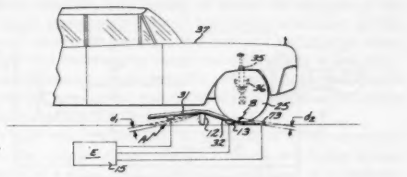
METHOD AND APPARATUS FOR TESTING SHOCK ABSORBERS

John D. KcKenney, South Laguna, and William H. Conway, Hacienda Heights, both of Calif., assignors to John D. McKenney and William H. Conway, a part interest to each

Filed July 9, 1973, Ser. No. 377,510
Int. Cl. G01m *17/04*
U.S. Cl. 73—11 **9 Claims**

1. Apparatus for testing the performance of shock absorbers in combination with a suspension of a vehicle comprising:

a ramp adapted to support a wheel of the vehicle advanced thereover and responsive in deformation to the loading of the wheel thereon, said ramp being conformed in longitudinal cross section to substantially define a sinusoidal function terminating at either end at the adjacent minimum elevations thereof and including a substantially central maximum elevation:



a fulcrum attached to the ramp proximate the center thereof and extending normal thereto to a length beyond a plane joining the ends of said ramp; and

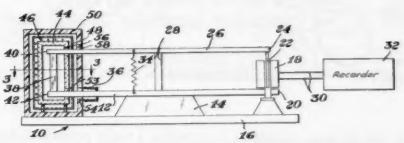
measuring means connected to register the deformation of said ramp for producing a signal indicative of the distributed loading difference thereon in complement about said fulcrum in response to the advancing of the wheel thereover.

3,877,290

DILATOMETER

Chin Haun Cheng, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Mar. 5, 1973, Ser. No. 337,867
Int. Cl. G01n *25/16*
U.S. Cl. 73—16 **4 Claims**



1. Dilatometer apparatus comprising an elongated horizontally disposed fixed beam and an elongated horizontally disposed movable beam, said movable beam being pivotally mounted between its ends with respect to said fixed beam, a differential transformer having a body part and a movable core part, said body part being fixed positionally with respect to said fixed beam and said movable core part being coupled to an end of said movable beam, means for retaining by compressive force a sample to be tested between the adjacent ends of said beams which are remote from said transformer, said ends which are remote from said transformer being enclosed in a temperature controllable housing.

3,877,291

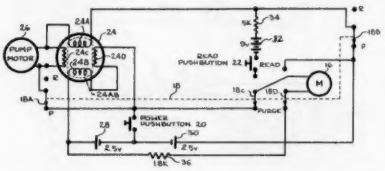
PORTABLE BREATH TESTER

Joseph P. Hoppesch, Schaumburg, and Stuart A. Schubert, Rolling Meadows, both of Ill., assignors to Borg-Warner Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 280,927, Aug. 15, 1972, abandoned. This application Mar. 19, 1973, Ser. No. 342,566
Int. Cl. G01n *27/14*
U.S. Cl. 73—27 R **17 Claims**

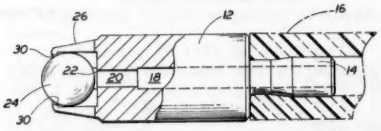
1. The method of testing breath for alcohol content using a system including a semiconductor detecting unit, which unit has a semiconductor material exhibiting one electrical property after having been conditioned in an atmosphere essentially free of reducing substances and another property when exposed to a reducing atmosphere, such as breath entrained alcohol, and having means to heat the detector to at least two elevated temperatures, and means to sense the electrical property of the detector, comprising the steps of:

a. conditioning the detecting unit semiconductor material at a high temperature sufficient to rapidly diminish the alcohol from the space around the material for a period of time sufficient to cause the material to exhibit one electrical property state;



b. reducing the temperature to some lower value, and exposing a breath sample to the detector; and
c. sensing the change in the electrical property state which change is indicative of alcohol content.

3,877,292
AIR GAGE CARTRIDGE
Robert C. Messmer, King of Prussia, Pa., assignor to J. M. Schmidt Precision Tool Co., Inc., West Chester, Pa.
Filed Oct. 15, 1973, Ser. No. 406,151
Int. Cl. G01b *13/00*
U.S. Cl. 73—37.5 **8 Claims**

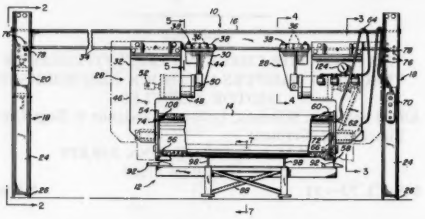


1. An air gage cartridge comprising a body portion defining a nozzle opening at one end thereof, an air supply passage formed in said body portion for delivering a supply of air to said nozzle opening, a gaging ball, and means for mounting said gaging ball for free movement on said body portion adjacent the nozzle opening so that air flowing through said nozzle opening urges said ball away from the nozzle opening for contact with a workpiece, said mounting means including portions limiting the movement of said ball away from said nozzle opening and flexible portions cooperating with said limiting portions for supporting said ball for movement toward and away from said nozzle opening within a limited range of movement, said flexible portions being adapted to be flexed from their normal position to permit the removal of said ball from said cartridge in response to the movement of said ball in the direction away from said nozzle opening past said limiting portions, said flexible portions comprising a plurality of spring fingers extending from said one end of said body portion so as to be freely exposed from the outside of the cartridge for freedom of flexure during ball removal, said spring fingers being circumferentially spaced around said gaging ball for guiding the same for movement toward and away from said nozzle opening.

3,877,293
PIPE TESTING SYSTEM
Roy A. McKeage, Bellbrook, Ohio, assignor to Price Brothers Company, Dayton, Ohio
Filed Dec. 18, 1972, Ser. No. 315,816
Int. Cl. G01m *3/28*
U.S. Cl. 73—49.1 **15 Claims**

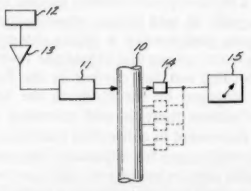
1. A pipe testing system for testing a pipe section having a bell end and a complementary spigot end comprising:

a. rail means extending parallel to the axis of said pipe section being tested,
b. a bell adapter complementary to and adapted to engage said bell end of said pipe section and a spigot adapter complementary to and adapted to engage said spigot end of said pipe section whereby joint testing may be effected simultaneously with pipe testing,
c. carriage means carrying said adapters and movable along said rail means,



d. means for moving said carriage means along said rail means,
e. means for the selective application to the interior of said pipe section of:
i. a negative pressure, or
ii. a positive pressure,
f. means for venting the interior of said pipe section while said pipe section is engaged by said adapters, and
g. means for releasing said adapters from engagement with said ends of said pipe section after testing thereof.

3,877,294
VIBRATION TECHNIQUE FOR ROT DETECTION IN WOOD POLES AND TREES
Alan Douglas Shaw, Tasmania, Australia, assignor to The Fanner Manufacturing Company Pty. Limited, Victoria, Australia
Filed Mar. 14, 1973, Ser. No. 341,159
Claims priority, application Australia, Apr. 11, 1972, 8567/72
Int. Cl. G01n *29/04*
U.S. Cl. 73—67.2 **8 Claims**



1. A method of detecting the presence of decay in a wooden pole, the method comprising the steps of:
exciting said pole by a source of mechanical vibration at frequencies falling within the sonic frequency range, said source of mechanical vibration being applied at a selected peripheral one point along the length of said pole;
measuring emergent energy transmitted through said pole at a number of selected longitudinally spaced other points along the length of the pole, including at a point substantially opposed to said one point of application of said vibrations;
comparing the relative emergent energy levels at the respective said other points; and
detecting for a predetermined relative increase in the level of emergent energy at selected ones of the longitudinally

spaced said other points, such an increase in emergent energy level being an indication of the presence of decay within the pole.

3,877,295

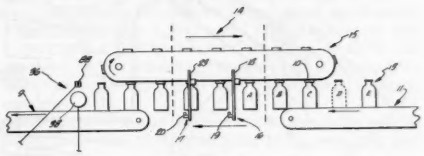
PLASTIC COATED BOTTLE TESTING SYSTEM

Curtis A. Hartman, Elmira, N.Y., assignor to Dart Industries Inc., Los Angeles, Calif.

Continuation-in-part of Ser. No. 232,384, March 7, 1972, abandoned. This application Aug. 29, 1973, Ser. No. 392,802

Int. Cl. G01m *7/00, 5/00*

U.S. Cl. 73—67.2 **7 Claims**



1. An inspection system for frangible bottles comprising:
conditioning means for striking frangible bottles to enlarge preexisting defects;
impact means for striking said frangible bottles and causing sound wave emissions;
electro-acoustic means for receiving said sound waves and converting them to electrical impulses;
monitoring means for sensing the character of said electrical impulses and causing an activation signal in response to a particular predetermined electrical impulse; and,
rejection means for discarding defective bottles upon receipt of said activation signal from said monitoring means.

3,877,296

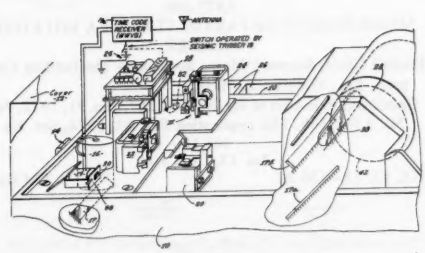
STRONG MOTION ACCELEROGRAPH WITH SELF-STARTER AND ELECTRICAL AS WELL AS LIGHT OUTPUTS

William Joseph Rihn, San Gabriel, Calif., assignor to Kinemetrics, Inc., San Gabriel, Calif.

Continuation-in-part of Ser. No. 96,325, Dec. 9, 1970, abandoned. This application Oct. 18, 1972, Ser. No. 298,536

Int. Cl. G01p *15/02*

U.S. Cl. 73—71.1 **14 Claims**



8. Seismic trigger means to provide, in response to an earth tremor or other sudden jarring movement applied to said trigger means, an electric current to actuate switching means, which switching means, in its first and original unswitched position, permits given apparatus to remain inoperative or to operate in a first predetermined manner, but when said switching means is switched into a second position, causes said apparatus to operate or to be stopped in a second predetermined manner, said trigger means comprising:

a. a permanent magnet disposed to provide a magnetic field;
b. a coil of wire;
c. means displaceably and resiliently suspending said coil in said magnetic field for oscillatory movement along a predetermined axis extending through said magnetic field, whereby any jarring of either the magnet or the means suspending the coil will produce relative oscillatory movement between the coil and the magnet along said axis and thereby induce a current flow in the coil;
d. amplifier means, said amplifier means being connected to amplify any current output when so induced in the coil by such relative movement; and
e. trigger relay means, the last said means being connected to the output of said amplifier means and being actuatable by a signal from said amplifier means of a predetermined value, whereby there is effectively created an electromagnetic trigger which is responsive to any P-wave exceeding that of a predetermined intensity to which the seismic trigger means may be subjected, and said trigger relay means being operatively associated with said switching means whereby, when current flow is induced in the coil by such relative movement, said switching means is moved from its said first and original position to its second position.

3,877,297

PROCESS AND APPARATUS FOR DETERMINING THE INFINITESIMAL-HARDNESS BEHAVIOUR OF SYNTHETIC MATERIALS, COATINGS AND DUCTIVE MATERIALS

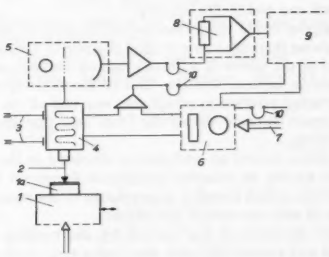
Kurt Martin Oesterle, 88 Goldbacherstrasse, 8700 Kusnacht, Switzerland

Filed Dec. 3, 1973, Ser. No. 421,484

Claims priority, application Switzerland, Dec. 4, 1972, 17702/72

Int. Cl. G01n *3/48*

U.S. Cl. 73—81 **15 Claims**

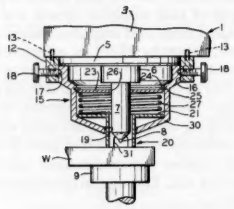


1. In a process for determining the infinitesimal-hardness behaviour of plastic materials, in particular coatings and ductile materials, including penetrating a test material layer with an indentor in dependence upon a load exerted on the indentor; and recording the extent of penetration; the improvement comprising: continually effecting said penetration by said indentor in small steps at narrowly defined locations on said layer, concurrently and continually increasing the load on said indentor; operatively connecting a process calculator and computer to a portion of said indentor providing measurement values of the depth of penetration in dependence upon the load exerted on said indentor, said calculator and computer continuously recording depths of penetration y in dependence upon loads F exerted on said indentor, transforming this relationship into F/y-quotients, plotting a curve through these F/y-quotients in dependence upon loads F and determining the crossing-point with the F/y-ordinate axis so as to indicate the value of the Infinitesimal-Hardness-Behaviour IHV.

3,877,298
WORKPIECE CLAMP AND TOOL SHIELDING DEVICE AND COMBINATION THEREOF WITH A TOOL APPLYING APPARATUS

Rajendra K. Narang, 9265 Lincoln Dr., Apt. E-1, Northfield, Ohio

Filed Dec. 13, 1973, Ser. No. 424,209
Int. Cl. G01n 3/48
U.S. Cl. 73—81 8 Claims



1. A detachable workpiece clamping and shielding device for a hardness tester having a rigid frame, a workpiece supporting anvil carried by the frame, a load applying plunger mounted on the frame in alignment with the work supporting face of the anvil and for axial movement toward the anvil to an extended position and away from the anvil to a retracted position, a penetrator on the end of the plunger facing the anvil, said device comprising;

a detachable hollow housing of fixed length and having coaxial openings at its ends, respectively;

a work clamping and shielding sleeve in the housing and having a portion at one end extending through and beyond one end of the housing;

said sleeve being supported by the housing for movement endwise thereof to an extended position in which said one end of the sleeve is a predetermined distance outwardly endwise beyond said one end of the housing and to a retracted position in which said one end of the sleeve is a lesser distance outwardly from said one end of the housing;

said sleeve having an end portion disposed in the housing and having an external peripheral flange on said end portion, which flange is wide relative to the outer periphery of said one end of the sleeve;

a fixed abutment in and carried by, the housing between said end portion and said other open end of the housing; a coiled compression spring in the housing coaxial with the sleeve and bearing at one end against the abutment and at the other end against that annular area on that face of the peripheral flange which faces toward the abutment, and which area is near the periphery of the flange and outside of the axially projected outermost periphery of said one end of the sleeve onto the flange and biasing the sleeve to a predetermined maximum extended position;

a second fixed abutment in the housing operative to limit the movement of said sleeve axially in the extending direction to said predetermined maximum extended position;

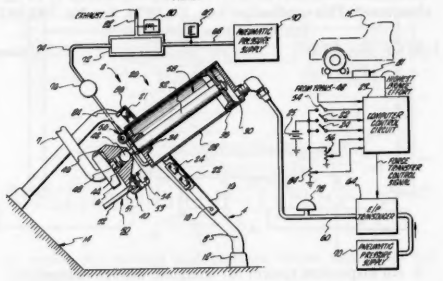
said assembled housing, sleeve, abutments and spring constituting a self-contained unit; and

connecting means adapted for connection in fixed position on the frame of a hardness tester, said connecting means being detachably connectable to said housing at the end of the housing opposite from said one end for securing the housing in fixed radial and axial position relative to said holder.

3,877,299
BRAKE PEDAL ACTUATOR

William Clayton, Sr., and Edwin Lee Cline, both of Pasadena, Calif., assignors to Clayton Manufacturing Company, El Monte, Calif.

Filed July 25, 1973, Ser. No. 382,385
Int. Cl. G01l 5/28
U.S. Cl. 73—132 32 Claims



1. In an actuator mechanism for controlling the operation of a vehicle brake pedal mounted adjacent the floor board of a vehicle in response to a control signal, the brake pedal being arranged to apply the brakes of the vehicle when moved in a first direction, the combination which comprises:

a removable frame member adapted to be positioned on the floor board adjacent the brake pedal, the frame member including means for engaging only the floor board to prevent movement of the frame member in the first direction;

a pedal contact member adapted to engage the brake pedal;

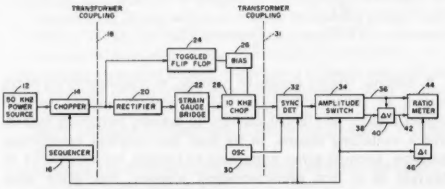
force receiving means secured to one of the frame and pedal contact members for receiving a manual reference force having a component in a first direction when the actuator is positioned on the vehicle floor board;

force transferring means responsive to the control signal and connected between the frame and pedal contact members for providing a limited range of movement between the members along the first direction and for applying an equal and opposite force to the frame and pedal contact members, the force having a magnitude proportional to the control signal when the members are restrained from movement within said range.

3,877,300
MEASUREMENT OF PARAMETERS ON A ROTATING MEMBER

Haskell Ginns, Belmont, Mass., assignor to The Indikon Company, Inc., Watertown, Mass.

Continuation-in-part of Ser. No. 222,267, Jan. 31, 1972, Pat. No. 3,797,305. This application Feb. 25, 1974, Ser. No. 445,150
Int. Cl. G01l 3/10
U.S. Cl. 73—136 A 32 Claims



1. A system for providing an indication of the magnitude of a parameter on a relatively moving element comprising:

means for coupling power from a point external of said relatively moving element to said relatively moving element;

a sensor for a parameter of said relatively moving element; means responsive to power coupled to said relatively moving element for energizing said sensor;

said sensor having a sensor output signal representative of a parameter to which said sensor is responsive;

means associated with said relatively moving element and operative for periodically providing a predetermined adjustment in a property of said sensor to provide a predetermined change in amplitude in said sensor output signal;

means for coupling said output sensor signal from said relatively moving element to a point external thereof;

means responsive to the coupled output sensor signal amplitude for providing a first signal representative of said output sensor signal when said adjusting means is not operative and for providing a second signal representative of said sensor output signal when said adjusting means is operative;

means responsive to said first and second signals for providing an indication of the parameter being sensed by said sensor.

3,877,301

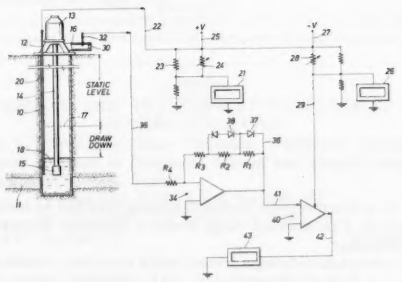
APPARATUS FOR INDICATING THE SPECIFIC CAPACITY OF A WELL

Owen F. Jensen, Jr., Box 18294, Houston, Tex. 77023

Filed Oct. 23, 1973, Ser. No. 408,660

Int. Cl. E21b *47/04*

U.S. Cl. 73—155 **3 Claims**



1. Apparatus for measuring the specific capacity of a well producing a liquid, such as water, while pumping the well at a substantially constant rate of production, said apparatus comprising means providing a first signal that is proportional to the distance the fluid level drops below the static fluid level at the rate the well is being produced, means providing a second signal that is proportional to the volume of liquid produced per unit of time; means for dividing the second signal by the first signal to provide a third signal having a value proportional to the specific capacity of the well, and means responsive to the third signal to indicate the specific capacity.

3,877,302

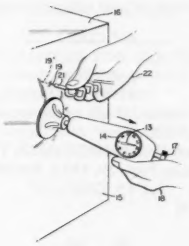
METHOD FOR DETERMINING TIGHTNESS OF FILM SHRUNK OVER A CONTAINER OR AN ASSEMBLY OF CONTAINERS

Anderson Miller, Saxonville, Mass., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 6, 1973, Ser. No. 422,492

Int. Cl. G01n *3/08*

U.S. Cl. 73—159 **4 Claims**



1. Method of determining the tightness of a substantially non-porous pellicular wrapper encasing at least the sides of a load comprising a container or an assembly of containers which comprises the steps of:

a. detachably attaching a force gage to said pellicular wrapper at a predetermined point,

b. pulling said force gage and said pellicular wrapper attached thereto a predetermined distance away from said load, and

c. measuring with said force gage the force required for pulling said pellicular wrapper said predetermined distance away from said load.

3,877,303

SPORT SPEEDOMETER

Gerhard Beckmann, Todiweg 51, D-7988 Wangen, assignor to Raum Italia, Kurtatsch, Italy

Filed Mar. 9, 1973, Ser. No. 339,945

Claims priority, application Germany, Mar. 11, 1972, 2211887

Int. Cl. G01f *1/00*

U.S. Cl. 73—228 **7 Claims**

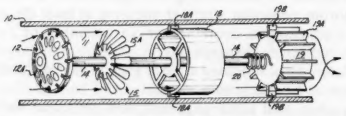
1. In an air flow measuring sport speedometer composed of a housing carrying an indicator scale and defining an air guide channel and an air entrance opening via which air moving past an object whose velocity is to be measured passes from the region outside the housing into the channel, and an air velocity indicator including a paddle blade mounted in the housing to extend into the channel and arranged to pivot relative to the housing under the influence of the air flowing through the channel, the improvement comprising: means for fastening the housing to the object whose velocity is to be measured in such a manner that the housing has any desired orientation about a first axis defined by the object; means providing a pivot connection between said fastening means and said housing for permitting said housing to be given any desired orientation

relative to said fastening means about a second axis normal to said first axis; retaining means disposed between said fastening means and said housing for automatically retaining said housing in the selected orientation relative to said fastening means, whereby said entrance opening can be placed in the desired orientation relative to the air flow independently of the orientation of said fastening means; and wherein said paddle blade is provided at its end with a velocity indication pointer arranged to cooperate with said indicator scale, said housing carries two indicator scales oriented transverse to one another and said paddle blade and its associated pointer are arranged to cooperate with both of said indicator scales.

3,877,304
FLOWMETER

LeRoy E. Vetsch, Seattle, Wash., assignor to Eldec Corporation, Lynwood, Wash.

Continuation of Ser. No. 116,492, Feb. 18, 1971, abandoned. This application Nov. 29, 1973, Ser. No. 420,078
Int. Cl. G01f *1/12*
U.S. Cl. 73—231 M **18 Claims**



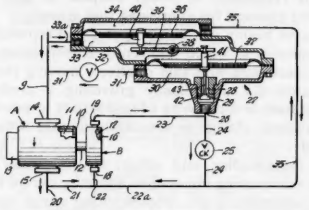
1. A flowmeter comprising in combination: housing means having a fluid inlet opening and a fluid discharge opening; a shaft supported for rotation in said housing means; a turbine member secured to said shaft and having a plurality of angled surfaces which are positioned to react with fluid passing thereacross to cause rotation of said shaft, said member having a first plurality of openings therein which extend through said turbine member generally parallel to said shaft; a valve member positioned adjacent said turbine member and including a substantially flat central section and a plurality of individually radially extending leaf spring members, each covering a different one of said first plurality of openings, said valve members being supported for rotation with said shaft wherein the surface portion of said turbine member adjacent said leaf spring members is conical and further including means holding said substantially flat central section of said valve member against said turbine member; impeller means supported for rotation inside said housing means; means including a spring member coupling said impeller means to said shaft so that said impeller means rotates with but lags behind said shaft as a function of mass flow rate.

3,877,305
COMPENSATED ROTARY GAS METER

Theodore A. St. Clair, Fairfield, Conn., assignor to Textron Inc., Providence, R.I.

Filed Sept. 4, 1973, Ser. No. 394,401
Int. Cl. G01f *3/08*
U.S. Cl. 73—254 **10 Claims**

1. A rotary gas meter having a rotor unit having inlet means and outlet means, said rotor unit having a rotor and a stator and having a capacity to measure in each cycle of rotation a predetermined volume of gas including a determinable volume of bypass leakage gas resulting from clearance between said rotor and said stator of said rotor unit, and means including conduit means, pumping means operated by said rotor and means responsive to the flow rate of the gas passing through the meter for returning from said outlet means to said inlet means of said rotor unit through said conduit means during

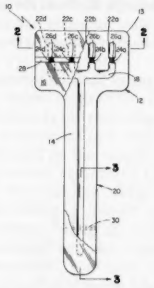


each cycle of operations thereof a volume of gas substantially equal to said volume of bypass leakage gas.

3,877,306
FUSIBLE PLUG TEMPERATURE INDICATING DEVICE

Ferdinand Heinmets, Wellesley Hills, Mass., assignor to Sarah A. Kurzon, Cambridge, Mass., a part interest

Filed Jan. 18, 1974, Ser. No. 434,510
Int. Cl. G01k *11/06*
U.S. Cl. 73—358 **6 Claims**



1. A thermometric device indicating exposure to temperature in a preselected range above a threshold temperature comprising

a structure defining a primary and a secondary chamber and a passage therebetween, said chambers having equal pressures therein,

a fusible plug lodged in and sealing said passage, said plug being made of material that melts at said threshhold temperature,

a control element operatively connected to and controlling the pressure in said first chamber, said element being responsive to an activating act by a user of said device to change the pressure in said primary chamber,

a zone in a wall of said passage being transparent and positioned to display a shift of position of said plug along said passage;

said device being prior to activation unresponsive to exposure to temperature in said preselected range above said threshold temperature, and after activation responsive to any such exposure, a differential pressure derived from said activating act aiding in providing a permanent indication thereof by a visible shift of said plug along said passage.

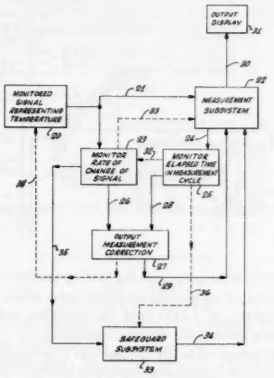
3,877,307
ELECTRONIC THERMOMETER

Heinz W. Georgi, La Jolla, Calif., assignor to Ivac Corporation, San Diego, Calif.

Continuation-in-part of Ser. No. 45,990, June 15, 1970, Pat. No. 3,702,076. This application Sept. 8, 1972, Ser. No. 287,341

Int. Cl. G01k *7/24*

U.S. Cl. 73—362 AR **62 Claims**



1. A method of anticipating measurement wherein the needed correction increment introduced varies with the elapsed time during which measurement is being taken, comprising the steps of:

monitoring a condition to be measured;

monitoring the rate of change of said condition;

measuring the elapsed time while performing said monitoring;

introducing a correction increment to the measurement of said condition to provide an advance indicating of the final state of said condition; and

varying said correction increment as a function of both said elapsed time and said rate of change of said condition.

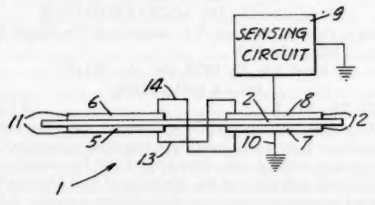
3,877,308
PYROELECTRIC TEMPERATURE COMPENSATED SENSING APPARATUS

Allen L. Taylor, Woodbury Township, Washington County, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 2, 1974, Ser. No. 430,055

Int. Cl. G01k *7/34*; **G01j** *5/34*; **H01v** *3/02*

U.S. Cl. 73—362 CP **8 Claims**



1. A pyroelectric temperature compensated sensing apparatus comprising the combination of:

a layer of poled pyroelectric material that produces electrostatic charges on its surfaces when its ambient temperature is varied, the charges on one surface being opposite in polarity to the charge on the other surface;

a plurality of pairs of conductive plates in surface-to-surface contact with said pyroelectric layer, each pair of plates including a first plate disposed on one surface of said layer, and a second plate substantially disposed opposite said first plate on the opposite surface of said layer;

connecting means for electrically interconnecting various plates of said pairs to form two sets of interconnected plates, each set includes at least one plate on one side of said layer and at least one plate on the opposite side of said layer; and

a sensing means connected between said two sets for detecting electrostatic charges on said two sets.

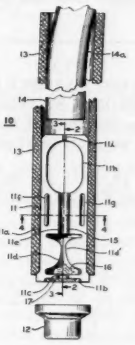
3,877,309
IMMERSION SAMPLER FOR MOLTEN MATERIAL

Richard J. Hance, Park Drive Manor 1105 B, Harvey & LIncoln Dr., Philadelphia, Pa. 19454

Continuation-in-part of Ser. No. 454,332, March 25, 1974, abandoned. This application May 6, 1974, Ser. No. 467,186

Int. Cl. G01n *1/12*

U.S. Cl. 73—425.4 R **10 Claims**



1. An immersion sampler device for obtaining a sample from a molten bath, said sampler including a mold structure having wall portions defining: a sample cavity having a configuration to produce a casting of the desired shape, means for venting said cavity, and a flow passage for filling said cavity, and the improvement wherein said wall portions define a flow passage having an entrance in an end face at the immersion end of said mold structure and a venturi which minimizes resistance to flow and effects smoother flow of molten material to said cavity and a thicker wall portion in the region of the venturi throat serving to extract heat from the molten material in a manner to effect freezing of molten material in said throat to prevent loss of sample from said cavity.

3,877,310
AUTOMATIC SAMPLER APPARATUS

Raymond Ernest Pecsar, Walnut Creek, and Brent Earl Wadsworth, Concord, both of Calif., assignors to Varian Associates, Palo Alto, Calif.

Filed Mar. 5, 1973, Ser. No. 337,799

Int. Cl. B08b *9/02*; **G01n** *1/00*

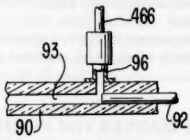
U.S. Cl. 73—425.6 **2 Claims**

1. A method of purging material from a syringe comprising:

a. providing a syringe comprising a tubular barrel defining an internal passageway having an axial end opening and a side opening and a plunger supported in said passageway for axial movement relative to said barrel, the imaginary solid intersection of said internal passageway and an extension of the perim-

eter of said side opening defining a space within said internal passageway;

b. positioning said plunger in said barrel with a projecting plunger end portion disposed at least adjacent said side opening such that said plunger end portion intersects said space defined by said imaginary solid intersection;



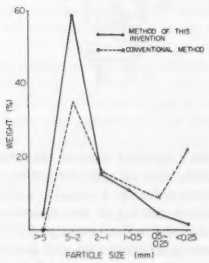
c. directing a purging liquid fluid into said passageway through one of said openings and discharging said fluid from said passageway through the other of said openings to purge said passageway; and

d. impinging said fluid on said projecting plunger end portion prior to discharging the fluid from said passageway to scrub said material from said plunger while purging said passageway.

3,877,311
METHOD FOR SIEVING A SAMPLE OF PARTICULATE MATERIALS FROM A SINTERING CHARGE

Kinichi Sugawara; Ryo Shimizu, and Masahiko Kawato, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Oct. 19, 1973, Ser. No. 407,831
Int. Cl. G01n *15/02*
U.S. Cl. 73—432 PS **4 Claims**



4. The method of claim **1** which further comprises the steps of

d. removing substantially all of the water from each portion of particulate material resulting from step (b);

e. weighing each portion of particulate material;

f. placing each portion of particulate material in a sieving means having an orifice size less than the particle range size of the portion of particulate material but greater than the size of the pulverulent material or powder adhering to the individual particles thereof;

g. washing each portion of particulate material thus causing the pulverulent material or powder adhering to individual particles to be dislodged therefrom and carried through the orifices of the sieving means;

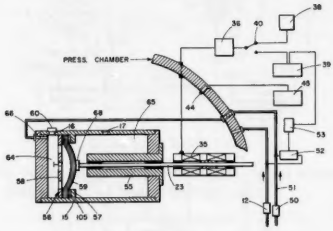
h. removing substantially all of the water from each portion of particulate material resulting from step (g); and

i. weighing each portion of particulate material resulting from step (h) thus providing an accurate determination of the weight quantity of pulverulent material or powder adhering to the individual particles constituting each portion of particulate material.

3,877,312
MATERIALS TESTING SYSTEM

Norman F. Audet, Southbora, and John E. Tirrell, Jr., Millis, both of Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 285,387, Aug. 30, 1972. This application Dec. 26, 1973, Ser. No. 428,482
Int. Cl. G01n *33/36, 25/18;* **G01b** *5/06*
U.S. Cl. 73—432 SD **7 Claims**



1. A material testing system for testing multiple characteristics of samples of candidate swimsuit and other materials at simulated depths of 1,000 feet of seawater and more in a common gas pressurized vessel comprising:

a pressure vessel of sufficient size to receive therein testing apparatus for testing the thickness changes of said materials;

said testing apparatus including a housing, a sample holder in said housing and at least two chambers disposed one each on opposite sides of the sample holder;

a sample of the material to be tested secured in said sample holder,

said chambers watertight, filled with water and provided with an access port in the top surface thereof;

means for selectively pressurizing by gas said pressure vessel, the water in the chambers of said testing apparatus when said ports are open, and said sample;

means for remotely controlling, monitoring and recording conditions in said pressure vessel and in the chambers of said testing apparatus;

means in said pressure vessel for sensing thickness changes in the sample in said sample holder and generating signals responsive to said changes; and

means outside of said pressure vessel and connected to said sensing means for monitoring and recording said thickness changes in said sample,

whereby the suitability of materials for use at selected ocean depths may be conveniently determined in a single pressure vessel in a laboratory environment.

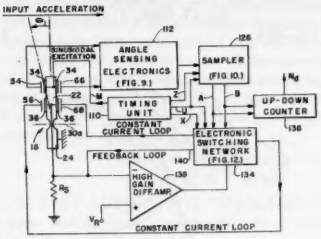
3,877,313
ELECTROSTATIC ACCELEROMETER

Lincoln S. Ferriss, Madison, N.J., assignor to The Singer Company, Little Falls, N.J.

Filed July 23, 1973, Ser. No. 381,771
Int. Cl. G01p *15/08*
U.S. Cl. 73—516 R **9 Claims**

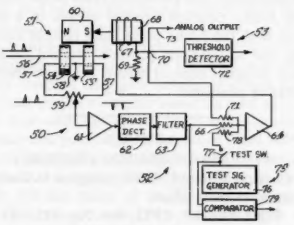
1. An accelerometer comprising a seismic mass mounted for displacement from a null position in response to input acceleration along a sensing axis, detecting means for producing an output signal indicative of the direction of said displacement, a pair of rebalance capacitors disposed on opposite sides of said seismic mass each having one electrode provided by at least a part of said seismic mass, the gap width of each said rebalance capacitor being defined approximately parallel to said sensing axis such that the electric fields established by said rebalance capacitors are also approximately parallel to said sensing axis, said gap width of each said rebalance capacitor being variable under said input acceleration, and circuit

means responsive to said output signal for applying constant current independent of said gap width to either one of said



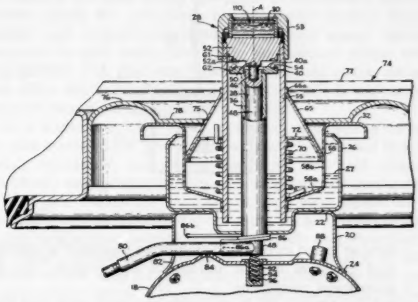
rebalance capacitors such that said mass is driven toward said null position.

3,877,314
ACCELEROMETER
Victor M. Bernin, Mount Prospect, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.
Filed Mar. 26, 1973, Ser. No. 345,248
Int. Cl. G01p *15/08*
U.S. Cl. 73—517 B **9 Claims**



1. An accelerometer comprising in combination; a movable magnetic member having a predetermined magnetic field strength, a ferrous metal member magnetically to receive and hold said movable magnetic member with a force proportional to said predetermined magnetic field strength, at least one closed loop magnetic core structure capable of being magnetically saturated in one state and magnetically unsaturated in another state as a result of the presence and absence, respectively, of a magnetic field from said movable magnetic member, said closed loop magnetic core member being positioned relative to said movable magnetic member to be in one of its magnetic states, a drive line passing through said closed loop magnetic core member, said drive line arranged to receive signal information therealong, a sense line passing through said closed loop magnetic core member, said sense line arranged for connection in circuit with signal receiving means, said sense line receiving signal information from said drive line as a result of transformer coupling therebetween when said closed loop magnetic core member is in an unsaturated state, whereby acceleration forces applied to said movable magnetic member equal or are greater than the force produced by said predetermined magnetic field strength will cause said movable magnetic member to separate from said ferrous metal member and move relative to said closed loop magnetic core member to change the magnetic state thereof.

3,877,315
WHEEL BALANCER
Tracy Carrigan, Lansing, Mich., assignor to FMC Corporation, San Jose, Calif.
Filed June 15, 1973, Ser. No. 370,270
Int. Cl. G01m *1/12, 1/14*
U.S. Cl. 73—459 **7 Claims**



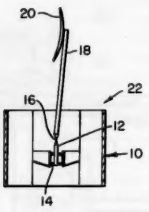
1. A method of statically and dynamically balancing a wheel and tire assembly having a wheel lug flange and a wheel rim, when supported in a generally horizontal position, with a static bubble balancer having a vertical axis of rotation and a run-out measuring device comprising the steps of: supporting the wheel and tire assembly about a single pivot point coincident with the vertical axis of rotation of the assembly; locating the point of static imbalance by allowing the assembly to pivot out of its horizontal position; repositioning the assembly from support by said single pivot point to planar support of said wheel lug flange in a horizontal reference plane perpendicular to said axis and independent of the plane of the wheel rim; establishing relative rotation between the assembly and the run-out measuring device about said axis; measuring the combined maximum lateral run-out of the wheel and tire assembly as a unit in linear units relative to said reference plane; locating the point of maximum lateral run-out of the assembly radially of the axis; and adding dynamic compensating weights to the wheel assembly in amounts in direct proportion to the combined amount of maximum lateral run-out of the wheel and tire assembly as a unit relative to the wheel lug flange, said compensating weights being added to the wheel assembly in the same radial plane as said point of maximum run-out and at a point diametrically opposite and on the same side of the assembly as the point of maximum run-out if the point of static imbalance lies within 45° from the point of maximum run-out of the assembly, or at a point laterally opposed from and on the opposite side of the assembly from the point of maximum run-out if the point of static imbalance does not lie within 45° but is more than 135° from the point of maximum run-out.

3,877,316
ISOLATED FRAME ON PLATFORM STABILIZED BY SPINNING BODY
Gordon S. Reiter, Marina Del Rey; Charles P. Rubin, Los Angeles; Ronald V. Swanson, San Pedro; Bernard F. Burns, Jr., Manhattan Beach, and Anthony J. Iorillo, Pacific Palisades, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.
Division of Ser. No. 151,327, June 9, 1971, abandoned. This application Mar. 7, 1973, Ser. No. 338,793
Int. Cl. G01c *19/00;* **B64d** *45/04*
U.S. Cl. 74—5.5 **9 Claims**

1. A stabilized frame and stabilization means for stabilizing said frame, said stabilization means comprising:

a rotatable gyroscopic mass arranged for rotation about a spin axis;

a despun platform mounted on said gyroscopic mass for rotation on a platform axis with respect to said gyroscopic mass, the difference between the axis or rotation of said gyroscopic mass and the platform axis of rotation on said gyroscopic mass causing wobble of said platform;



a damper tuned to nutation frequency mounted to stabilize said platform against nutational disturbance, the improvement comprising:

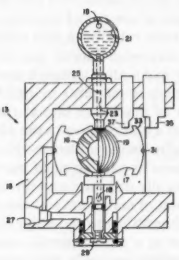
a stabilized frame freely pivotably mounted upon said platform on an axis substantially perpendicular to the platform axis so that said frame is substantially isolated from wobble about the pivot axis of said frame with respect to said platform.

3,877,317

DYNAMIC GAS-LIQUID GYROSCOPE BEARING

William W. Stripling, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 4, 1974, Ser. No. 430,962
Int. Cl. G01c *19/12, 19/28*
U.S. Cl. 74—5.6 A **2 Claims**



1. A transportation machine disposed for operation with initial high acceleration in the linear portion of a path, comprising:

a gyroscope having a stator with a spherical center portion disposed in axial relation with said transportation machine and provided with surface grooves; a rotor in spherical bearing relation with said center portion and a supply of highly compressed air communicating into said surface grooves to provide a cushion of the highly compressed air between said stator and rotor; and

a reservoir with fluid therein and a device secured to said stator for retention of said fluid in said reservoir;

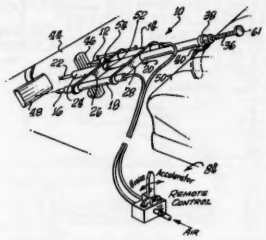
said stator including passages communicating between said reservoir and said surface grooves, and said retention device disposed to permit flow of said fluid to said surface grooves responsive to the high acceleration.

3,877,318

REMOTE CONTROL FOR AUTOMOBILE ACCELERATOR AND BRAKE PEDALS

John H. Castoe, 10234 McVine St., Sunland, Calif. 91040

Filed Apr. 11, 1973, Ser. No. 350,071
Int. Cl. G05g *11/00*
U.S. Cl. 74—481 **21 Claims**



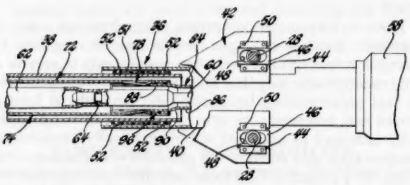
1. A remote controlled actuating device for depressing or releasing the accelerator pedal and brake pedal of an automobile, the device including accelerator position control means to be engaged with the accelerator pedal and movable between an operative position in which it depresses the accelerator pedal and an inoperative position in which it releases the accelerator pedal, brake position control means to be engaged with the brake pedal and movable between an operative position in which it depresses the brake pedal and an inoperative position in which it releases the brake pedal, support means maintaining the accelerator position control means in a position for engagement with the accelerator pedal and also maintaining the brake position control means in a position for engagement with the brake pedal, and remote control means for moving the accelerator position control means and the brake pedal position control means between their operative and inoperative positions.

3,877,319

STEERING COLUMN ASSEMBLY

Duane D. Cooper, Midland, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 19, 1973, Ser. No. 416,831
Int. Cl. B62d *1/16*
U.S. Cl. 74—492 **3 Claims**



1. In a steering column assembly adapted for axial collapse in an energy absorbing mode in response to an axially directed force input exceeding a predetermined minimum magnitude, the combination comprising, a first tube member rotatably disposed on said steering column assembly, a second tube member rotatably disposed on said steering column assembly in axial alignment with said first tube member and including an end portion disposed in radially spaced telescopic relationship with respect to a corresponding end portion on said first tube member, bearing means disposed in the space between said telescopically related end portions for facilitating relative axial collapse therebetween, means on one of said first and said second tube member end portions defining a plurality of receptacles, means in the other of said first and said second tube member end portions defining a corresponding plurality

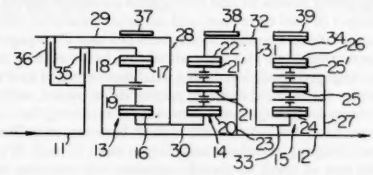
of radially deformable keys projecting into respective ones of said receptacles for coupling said first and said second tube members for unitary rotation, and means on said one of said first and said second tube member end portions defining a plurality of abutments engaging corresponding ones of said keys for preventing relative axial collapse between said first and said second tube members, each of said abutments being operative to effect radial deformation of the corresponding one of said keys out of said receptacles for permitting relative axial collapse between said first and said second tube members when said axially directed force input achieves said predetermined minimum magnitude.

3,877,320

PLANETARY AUTOMOTIVE TRANSMISSION

Tetsuya Iijima, Tokyo, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Feb. 7, 1974, Ser. No. 440,583
Claims priority, application Japan, Feb. 10, 1973, 48-16114
Int. Cl. F16h *57/10*
U.S. Cl. 74—759 **18 Claims**



1. An automotive power transmission system for providing four forward and one reverse speed, comprising, in combination, a drive shaft, a driven shaft, first, second and third planetary gear assemblies each comprising an externally toothed sun gear rotatable about an axis in line with said driven shaft, an internally toothed ring gear rotatable about said axis, at least one planet pinion rotatable about its own axis and about said axis in line with the driven shaft and engaging on one hand with said sun gear and on the other hand with said ring gear and a pinion carrier connected to said at least one planet pinion and rotatable therewith about said axis in line with the driven shaft, the sun gears of the first and second planetary gear assemblies being connected to and rotatable with each other through a first connecting member, the pinion carriers of the first and second planetary gear assemblies being connected to and rotatable with the driven shaft, the ring gear of the second planetary gear assembly being connected to and rotatable with one of the three members, viz., the sun gear, the ring gear and the pinion carrier of the third planetary gear assembly through a second connecting member, one of the remaining two of said three members being connected to and rotatable with the driven shaft, a first clutch connected between the drive shaft and the ring gear of the first planetary gear assembly, a second clutch connected between the drive shaft and said first connecting member, a first brake engageable with said first connecting member, a second brake engageable with said second connecting member and a third brake engageable with the other of said remaining two of said three members of the third planetary gear assembly.

3,877,321

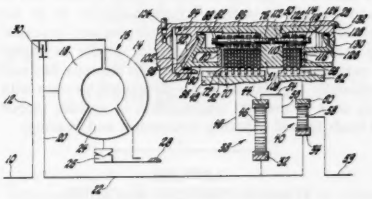
TRANSMISSION HAVING HYDRAULIC PRELOAD MOTOR FOR AXIALLY POSITIONING BRAKE COMPONENTS

John E. Storer, Jr., Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 23, 1973, Ser. No. 408,466
Int. Cl. F16d *55/00, 55/18, 13/28*
U.S. Cl. 74—768 **5 Claims**

1. A transmission having input and output means, a gear unit operatively connecting said input means to said output means, a casing for said transmission, friction brake means disposed in said housing operatively connected to said gear unit and selectively engageable to condition said gear unit for a predetermined input/output speed ratio, anchor means for said brake means, said anchor means having a radially extending backing flange behind said friction brake means, means mounting said anchor means for limited axial movement in said casing, stop means operatively connected to said casing for limiting the axial sliding movement of said anchor means, piston means for selectively engaging said friction brake means and hydraulically actuated preload motor means mounted in said casing for urging said anchor means into engagement with said stop means so that said piston means can effect the subsequent engagement of said brake means without movement of said anchor means.

3. A transmission having an input and an output, a casing for said transmission, gear means operatively disposed in said casing operatively connecting said input and said output, selectively engageable friction means operatively connected to said gear means for conditioning said gear means for a predetermined input/output speed ratio, anchor means in said casing, said anchor means having an inwardly extending backing flange operatively disposed adjacent to one side of said friction means, stop means in said casing adjacent to one side of said anchor means, a hydraulically operated preload motor operatively disposed in said casing adjacent to the other end of said anchor means, means for supplying pressure to said



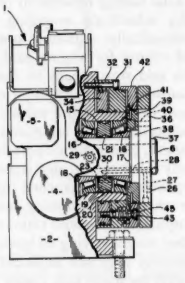
preload motor so that said preload motor exerts an axial clamping force upon said anchor means to thereby urge said anchor means into engagement with said stop means, and hydraulically operated piston means operatively disposed in said preload motor for selectively engaging said friction means to condition said gear means for said predetermined input-/output speed ratio.

4. A transmission having an input and an output, a casing for said transmission, gear means in said casing operatively connecting said input and said output, separate selectively engageable friction means operatively connected to said gear means for conditioning said gear means for predetermined input/output speed ratios, a first hydraulically operated piston for one of said friction means, a housing operatively disposed in said casing for said first piston, anchor means mounted in said casing, said anchor means having a central backing flange operatively disposed between said separate friction means, stop means in said casing adjacent to one end of said housing, hydraulically operated preload motor means aligned with one end of said anchor means operatively disposed in said casing, means for supplying a fluid pressure to said prelaod motor so that said preload motor exerts an axial force on said anchor means and said housing for clamping said anchor means and said housing between said preload motor and said stop means, and a second hydraulically operated piston means operatively disposed in said preload motor for engaging another of said friction means.

3,877,322
INDEXER WITH DIAPHRAGM TYPE DISC BRAKE

Milton L. Benjamin, Chagrin Falls, and David D. Walker, Solon, both of Ohio, assignors to Erickson Tool Company, Solon, Ohio

Filed July 1, 1974, Ser. No. 484,767
Int. Cl. B23b 29/32
U.S. Cl. 74—823 7 Claims

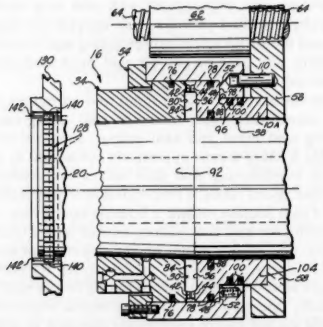


1. In an indexer of the type wherein a housing has a spindle journalled in axially spaced apart bearings and operatively connected at one end to an indexing mechanism in said housing for imparting rotary indexing movement to said spindle about its longitudinal axis and to a workpiece adapted to be mounted on the other end of said spindle, the improvement which comprises an annular laterally flexible brake disc having an inner peripheral portion non-rotatably and axially fixedly secured in coaxial relation to said spindle and having an outer peripheral portion axially adjacent to an annular portion of said housing; and a fluid pressure actuated ring axially movable with respect to said spindle to engage the outer peripheral portion of said disc to laterally flex said disc to frictionally engage said outer peripheral portion with said housing thus to prevent transmission of spindle torque and radial loads to said indexing mechanism and bearings.

3,877,323
TURRET INDEXING MACHINE

Rudolf Vetsch, Walton Hills, Ohio, assignor to The Warner & Swasey Company, Cleveland, Ohio

Filed Jan. 9, 1973, Ser. No. 322,131
Int. Cl. B23b 29/32
U.S. Cl. 74—826 14 Claims

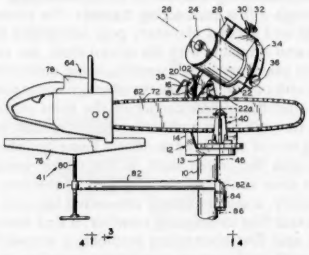


1. A machine tool for operating on a workpiece, said machine tool comprising a base, turret means rotatably mounted in said base for holding a plurality of tools for operating on the workpiece, said turret means including a movable turret bar, means for supporting said turret bar for axial and rotational movement relative to said base, and a turret head connected with one end portion of said turret bar, coupling means operable between an engaged condition holding said turret bar against rotation relative to said base and a disengaged condition in which said turret bar is rotatable relative to said base to rotate said turret head and change the position of tools on said turret means relative to a workpiece, said coupling means including a first coupling member movable relative to said turret bar, a first set of teeth disposed on said first coupling member, a second coupling member fixedly connected with said turret bar, and a second set of teeth disposed on said second coupling member, said first and second sets of teeth being disposed in meshing engagement when said coupling means is in said engaged condition and being spaced apart when said coupling means is in said disengaged condition, first drive means for effecting rotation of said turret bar relative to said base when said coupling means is in said disengaged condition, second drive means connected with said base and said first coupling member for moving said turret bar axially relative to said base, said second drive means being operable to apply a force to said first coupling member in a direction tending to move said first coupling member away from said second coupling member to thereby tend to effect disengagement of said first and second sets of teeth and operation of said coupling means to said disengaged condition during axial movement of said turret bar, and actuator means for effecting operation of said coupling means between said disengaged and engaged conditions and for maintaining said coupling means in said engaged condition during axial movement of said turret bar under the influence of said second drive means, said actuator means including chamber means for receiving fluid under pressure to effect relative movement between said first and second coupling members and engagement of said first and second sets of teeth to thereby operate said coupling means from said disengaged condition to said engaged condition and for holding fluid under pressure to maintain said first and second sets of teeth in engagement and said coupling means in said engaged condition during axial movement of said turret bar.

3,877,324
GRINDER FOR SAW BAR MOUNTED SAW CHAIN

Elmer Ray Silvey, 1231 Dutton Rd., Eagle Point, Oreg. 97524

Filed Apr. 29, 1974, Ser. No. 465,175
Int. Cl. B23d 63/16
U.S. Cl. 76—25 A 15 Claims



1. In a machine for sharpening the cutter elements of a saw chain while such chain remains on the bar of a chain saw, including a disc-shaped grinding wheel and wheel support means mounting said wheel for rotation about its central axis, saw bar clamping means for clamping a saw bar in a vertical disposition below said grinding wheel with a saw chain on said bar,

said saw bar clamping means being pivotable about a vertical pivot axis passing through said area of grinding engagement of said grinding wheel to first and second positions of adjustment for grinding right and left-hand cutter elements respectively,

adjustable saw chain hold-down means operable to permit forward movement of a saw chain on said saw bar and to hold a cutter link of the saw chain down against said saw

bar and in an adjustable position relative to said area of grinding engagement of said wheel for receiving an edge of said wheel in grinding position with respect to a cutter element of said chain in either of said first and second positions of adjustment of said clamping means,

and chain saw support means offset laterally from said clamping means for supporting the chain saw while said saw bar is clamped in said clamping means, said saw support means being swingable about a vertical swing axis coincident with said vertical pivot axis of said clamping means such that swinging movement of said saw support about said vertical swing axis causes a corresponding pivoting movement of said clamping means about its said pivot axis when a chain saw on said saw support means has its saw bar clamped in said clamping means.

3,877,325

SHAPING TOOL FOR CREATING ARTISTIC DESIGNS IN SAND ART BOTTLES

Roy Wall, 705 Bernice St., Farmerville, La. 71241

Filed Oct. 26, 1973, Ser. No. 410,193
Int. Cl. B25f *1/00*
U.S. Cl. 81—3 R **6 Claims**

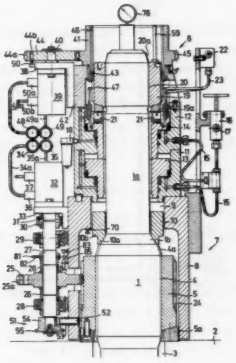
1. A shaping tool for creating artistic designs in sand art bottles terminating at the upper end in a relatively narrow open ended neck portion and having a side wall sloping downward and outward therefrom to a relatively wide main body portion comprising an elongated rod-like member having first and second ends, substantially flat first and second shaping tips on the first and second ends respectively of the rod-like member for creating artistic designs in a plurality of superimposed multicolored layers of sand or sand substitute in the bottle, and a grasping portion which is a loop formed in the rod-like member intermediate the first and second shaping tips and located a sufficient distance from each of the first and second shaping tips to allow the loop to extend outward from the opening in the neck of the sand art bottle when either the first or second shaping tip rests on the bottom of the bottle, the rod-like member being curved between the grasping portion and each of the first and second shaping tips whereby the flat first and second shaping tips may be inserted downward into the bottles via the opening in the neck thereof and positioned properly against the internal bottle surface to create artistic designs therein at any point between the bottom and the neck, the arrangement and configuration of the rod-like member, the flat first and second shaping tips, and the grasping portion being such that a vertical plane passing generally through the longitudinal axis of the rod-like member also passes generally through the longitudinal axis of the grasping portion and is generally normal to first and second horizontal planes passing through the flat first and second shaping tips respectively, and the loop having a means formed therein whereby upon flexing the loop breaks and the shaping tool may be divided into two shaping tools.

3,877,326

TENSIONING APPARATUS

Gerhard Köck, Erkelenz; Günter Wallrafen, Erkelenz-Kuckhoven; Erhard Hoffmann, Huckelhoven, and Hubert Buschfeld, Erkelenz, all of Germany, assignors to Maschinen- und Bohregerate-Fabrik Alfred Wirth & Co., K.G., Erkelemz, Rhineland, Germany

Filed Dec. 3, 1973, Ser. No. 420,899
Claims priority, application Germany, Dec. 1, 1972, 2258859
Int. Cl. B25b *29/02*
U.S. Cl. 81—57.38 **27 Claims**



1. Apparatus for simultaneously tensioning a number of screw bolts, necked-down bolts, tie bars or other elements, provided with fixing nuts, the apparatus including a supporting frame for tensioning assemblies, which can be set down on the screw bolts, and each of which has at least one cylinder with a piston slidable within the latter, which piston acts on a force-transmitting element, particularly in the form of a nut, which can be screwed down on to the screw bolt which is to be tensioned, and the apparatus being further provided with means located on the support frame and serving to turn the fixing nuts on the screw bolts, wherein the apparatus comprises motor-driven parts for rotating the force-transmitting elements, so as to screw or unscrew the latter on to or from the screw bolts, and holding devices for the fixing nuts on the supporting frame including means for retaining the nuts on the frame after they have been released from the screw bolts.

3,877,327

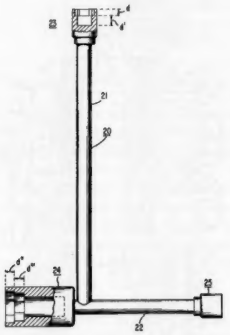
SOCKET WRENCHES

Harold Gustave Erm, 128 Westover Ave., West Caldwell, N.J. 07006

Filed Jan. 2, 1973, Ser. No. 320,658
Int. Cl. B25b *13/06*
U.S. Cl. 81—121 R **2 Claims**

1. A wrench-socket which is adapted to receive insertion into its recessed interior of a fastener-head of either of two different types, such as of different shapes and/or sizes, and to thereupon engage the inserted head with substantial torque-imparting contact between portions of interior surfaces of the socket and corresponding portions of outside surfaces of said head CHARACTERIZED IN:

that said recessed interior of the socket comprises (1) an entrance-portion which extends over a distance *d* between the plane of entrance of the socket and a bottom-plane which is parallel thereto and contains a plurality of shoulders for preventing fastenerheads of one of said two types from being more deeply inserted into the socket than said bottom-plane and (2) a deeper-lying-portion which extends over a distance *d'* between said bottom-plane and the bottom of the recessed interior of the socket; that said entrance-portion is adapted to receive insertion of a fastener-head of either of said two types as deeply as to said bottom-plane and to thereupon engage that head with a respective one of two different predetermined amounts of torque-imparting contact between portions of its interior surfaces and corresponding portions of outside surfaces of the inserted head and that, to that end, said entrance-portion comprises two different groups of peripheral subdivisions of its torque-imparting interior surfaces which are respectively adapted to closely-contact and thereby to engage in torque-imparting-relationship corresponding groups of torque-receiving peripheral subdivisions of exterior surfaces of fastener-heads of said two different types; that said deeper-lying-portion comprises interior surfaces which are adapted to closely-contact and thereby to engage in torque-imparting-relationship exterior surfaces of inserted heads of only the other of sad two types; that some of said group of subdivisions of interior surfaces of said entrance-portion which are adapted to contact exterior surfaces of fastener-heads of said other type are so alligned with predetermined portions of said interior surfaces of said deeper-lying-portion that a fastener-head of said other type upon being inserted into said entrance-portion is guided therethru past said shoulders and into the deeper-lying-portion whereby interior surfaces of both portions (1) and (2) of said recessed interior of the socket will engage that head in torque-imparting-relationship; that the sum of the areas of all torque-imparting surfaces comprised in the group of peripheral subdivisions of the entrance-portion which are adapted to engage a head of said other type comprises a substantially smaller percentage of the sum of all torque-imparting surfaces comprised in said entrance-portion than the percentage thereof comprised in the sum of the areas of all of said surfaces of said other group of peripheral subdivisions of the entrance-portion; and that the ratio of (*d* plus *d'*) to *d* is large enough, in proportion to the relative smallness of said substantially smaller percentage for said deeper-lying-portion to contribute enough additional torque-imparting contact to an inserted head of said other type to enable the socket to impart substantially equal amounts of torque to fastener-heads of said two types.

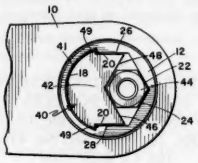


3,877,328

END WRENCH AND SOCKET WITH REDUCING INSERTS

Thomas Milton Sullivan, 3953 Oregon St., San Diego, Calif. 92104

Filed Feb. 11, 1974, Ser. No. 440,962
Int. Cl. B25b *13/58*
U.S. Cl. 81—185 **7 Claims**



1. A wrench with provision for reducing inserts so that the wrench may be utilized to turn a wide range of nut sizes wherein the improvement comprises:

a nut drive body having an insert and nut reception cavity in at least one side thereof,

said cavity comprising two adjacent nut engagement flats and a diametrically opposed insert engagement channel, said insert engagement channel comprising a partial cylinder insert engagement surface,

said nut engagement flats intersect at an included angle of 120°,

each of said nut engagement flats intersects with accommodation flats at an included angle of 120°,

said accommodation flats extend between said nut engagement flats to said insert engagement channel,

an insert,

said insert having a partial cylinder surface corresponding to said insert engagement surface.

3,877,329

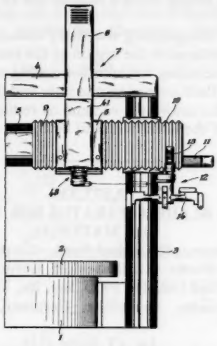
TOOL SUPPORT WITH TOOL SLIDE VERTICALLY DISPLACEABLE THEREIN, WITH A TOOL EXCHANGING DEVICE ASSOCIATED WITH SAID TOOL SLIDE

Fritz Noa, Rheydt, Germany, assignor to Schiess Aktiengesellschaft, Dusseldorf, Germany

Filed June 20, 1973, Ser. No. 371,847
Claims priority, application Germany, June 21, 1972, 2230144
Int. Cl. B23b *3/06, 7/16*
U.S. Cl. 82—2 R **5 Claims**

1. In a machine tool having a frame, spindle support means moveable vertically and transversely in said frame, a spindle in said support means comprising a spindle bar rotatable and axially moveable in said spindle, a tool head detachably connected to said spindle bar at the lower end and having at least one notch for receiving a tool, said tool head being rotatable on the spindle and being adapted to be locked to the spindle in rotated positions, a conduit extending axially through said spindle bar and adapted at the upper end to receive pressure fluid, said conduit at the lower end sealingly engaging a recess formed in the tool head, a clamp member in said notch for clamping a tool therein, cylinder bore means in the tool head, piston means connected to the clamp member and extending into said cylinder bore means, spring means acting on said piston means and urging said clamp member in tool clamping direction, and channel means in said tool head operable in at

least one rotated position of the tool head on the spindle to communicate said cylinder bores with said recess whereby a



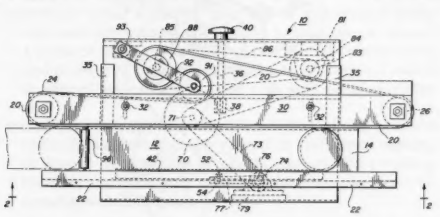
supply of pressure fluid to said conduit will move said clamp member in tool releasing direction.

3,877,330

MUFFIN SCORING MACHINE

Eugene M. Noel, Newton Highlands, Mass., assignor to Albert S. Schmidt, Sr., Wormleysburg, Pa.

Filed June 12, 1974, Ser. No. 478,450
Int. Cl. B26d *3/08*
U.S. Cl. 83—6 **16 Claims**



1. A muffin scoring device comprising a generally horizontal work surface having a passageway extending from end to end of the work surface for muffins to pass therealong, a guide rail extending along one side of said passage, a reciprocable knife blade extending lengthwise of said guide rail and projecting a predetermined distance therefrom into said passageway, and means extending along the opposite side of said passage for rolling muffins edgewise along said guide rail for peripheral engagement with the projecting edge of said knife blade.

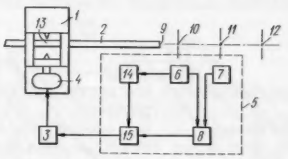
3,877,331

METHOD OF CONTROL OF MACHINE FOR PULSE CUTTING CONTINUOUS BAR INTO MEASURED LENGTHS AND DEVICE FOR REALIZATION THEREOF

Anatoly Semenovich Saveliev, ulitsa Chkalova, 7, kv. 22; Vadim Grigorievich Kononenko, ulitsa Chkalova, 15, kv. 12; David Alexandrovich Raizman, ulitsa Chernyshevskogo, 84, kv. 29; Vitaly Alexandrovich Boguslavsky, ulitsa Kharkovskaya, 82, kv. 43; Sergei Vasilievich Yatsenko, Moskovsky prospekt, 204/1, kv.36, and Vitaly Evgenievich Strizhenko, Osnovyanskaya ulitsa, 56, kv. 1, all of Kharkov, U.S.S.R.

Filed Jan. 31, 1974, Ser. No. 438,457
Int. Cl. B26d *5/12, 3/00, 5/20*
U.S. Cl. 83—13 **3 Claims**

1. A method of control of a machine for the pulse cutting of a continuously casting bar into measured lengths during the continuous casting of metal, consisting in that, in the course of said bar travel, measurements are taken of the time of passing, by said bar front end, of points spaced one from the other along an axis of said bar travel to a distance equal to the path travelled by said bar at a maximum speed and within maximum time required for filling a combustion chamber with a fuel mixture, the latter of the above points, along the direction of said bar travel, being equally spaced from a point indicating a measured length of a billet comparison is made



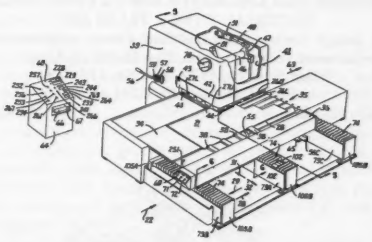
thereafter of said measured time and the time preset for filling said combustion chamber with said mixture and, depending on the result of the comparison, control is exercised of the moment when the filling of said chamber begins so that the time of the completion of its filling should coincide with the moment when the front end of the bar reaches the point indicating the measured length of the billet, and this is the moment when the billet is being cut.

3,877,332

AUTOMATIC SHEARING METHOD

Gerald V. Roch, New Augusta, Ind., assignor to Hurco Manufacturing Company, Inc., Indianapolis, Ind.

Continuation of Ser. No. 286,898, Sept. 7, 1972, which is a division of Ser. No. 42,047, June 1, 1970, Pat. No. 3,691,887. This application Jan. 4, 1974, Ser. No. 430,768
Int. Cl. B23d *15/08, 33/02*
U.S. Cl. 83—13 **37 Claims**



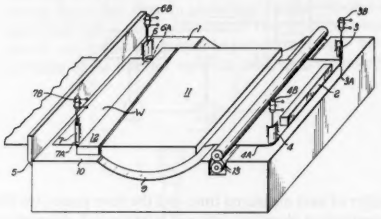
1. A method of power shearing comprising the steps of:
gripping a portion of a member to be sheared;
moving the gripped portion toward a pair of power operated shears and stopping movement at a location of the gripped portion remote from said shears, thereby placing another portion of the member in position for shearing by said shears;
and shearing said member on intersecting lines while holding said member in one position, beginning the shearing at one edge of the member and continuing along one of said lines to a point of intersection of the lines, and continuing the shearing from said point along the other of said lines to another edge of said member, thereby removing a corner blank from said member at a location thereon remote from the gripped portion.

3,877,333

SHEET LOCATING DEVICE

Edward Albert Ernest Illingworth, and Eric Stone, both of Ilford, England, assignors to Ilford Limited, Ilford, Essex, England

Filed Nov. 6, 1973, Ser. No. 413,203
Claims priority, application United Kingdom, Nov. 22, 1972, 53868/72
Int. Cl. B26d 7/02; B65h 9/00; B26d 9/00
U.S. Cl. 83—17 18 Claims



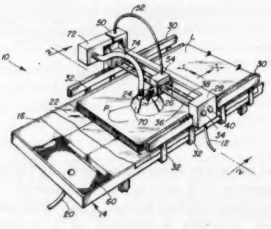
1. A method of performing a cross cutting operation on a travelling flexible web of material to form discrete sheets of material followed by an operation on the trailing edge of the thus formed severed sheet of material, which method comprises moving the leading edge of the web to a clamping station, clamping the leading edge of the web, cross cutting the web to form a severed sheet of the flexible web material, causing the middle of the severed sheet to bow in a predetermined curvature whilst maintaining the trailing edge of the sheet parallel to the position in which it was cross cut, thus causing the trailing edge of the sheet to move towards the leading edge of the sheet by a pre-determined distance and then performing the operation on the trailing edge of the severed sheet.

3,877,334

METHOD AND APPARATUS FOR CUTTING SHEET MATERIAL WITH A FLUID JET

Heinz Joseph Gerber, West Hartford, Conn., assignor to Gerber Garment Techology, Inc., East Hartford, Conn.

Filed Nov. 23, 1973, Ser. No. 418,548
Int. Cl. D06h 7/00; B26f 3/00
U.S. Cl. 83—22 21 Claims



1. Apparatus for cutting sheet material comprising:

supporting means defining a fluid permeable support surface on which the sheet material may rest and a fluid collection chamber below the surface and communicating with the surface for the transfer of fluid from the surface to the chamber;

a cutting tool mounted above the support surface and including a fluid jet nozzle directed toward the fluid permeable support surface to impinge a high velocity fluid cutting jet upon the sheet material;

controlled drive means for moving the cutting tool and the sheet material relative to one another in directions parallel to the support surface to move the fluid cutting jet from the nozzle along a desired line of a cut on the material; and

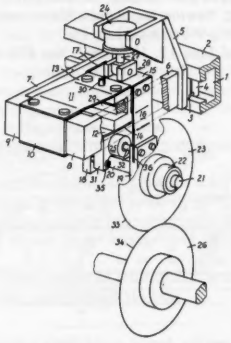
means for compressing the sheet material on the support surface at least in the region of the material being cut by the jet including vacuum generating means cooperating with the fluid collection chamber and the fluid permeable surface for drawing a vacuum or reduced pressure in the region of the sheet material being cut.

3,877,335

CIRCULAR BLADE APPARATUS FOR SLITTING WEBS OF MATERIAL

Hellmuth Lange, Dusseldorf-Nord, Germany, assignor to Jagenberg-Werke AG, Dusseldorf, Germany

Filed Oct. 16, 1973, Ser. No. 407,013
Claims priority, application Germany, Nov. 11, 1972, 2255275
Int. Cl. B26d 1/16
U.S. Cl. 83—501 4 Claims

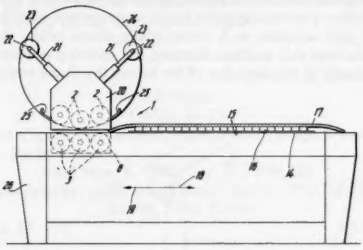


1. In an apparatus for slitting a web of material such as paper continuously passed therethrough and including a first circular blade rotatably mounted about an axially fixed first shaft, a cooperating second circular blade rotatably mounted about an axially displaceable second shaft, and a carriage for said second shaft, the improvement which comprises a first pair of spaced parallel leaf springs each connected fixedly at one end to said carriage, a coupling block carried by the other ends of said first pair of leaf springs, a second pair of spaced parallel leaf springs each connected at one end to said coupling block, the planes of said second pair of springs being substantially perpendicular to those of the first pair of springs and perpendicular to the axis of said second shaft, said second pair of springs at their other ends carrying said second shaft, means for displacing said coupling block relative to said carriage with flexing of said first pair of springs thereby to displace the axis of the second circular blade toward the axis of said first circular blade, and means for displacing the other ends of said second pair of springs with flexing thereof thereby to displace the axis of said second circular blade longitudinally and bring the second circular blade against the first circular blade in working relationship relative to said first circular blade.

3,877,336
BLANK PUNCHING APPARATUS

Walter Hillesheimer, Taunusstrasse 67, D-6078 Neu-Isenburg 1, Germany

Filed Oct. 29, 1973, Ser. No. 410,698
Claims priority, application Germany, Nov. 6, 1972, 2254281
Int. Cl. B26f 1/42
U.S. Cl. 83—512 9 Claims



1. Apparatus for punching blanks with a punching knife comprising,

support means for supporting said blanks on said punching knife,

a bridge member positioned for longitudinal reciprocal movement on said support means,

said bridge having a central cavity and an elongated lateral opening in the side portion of said bridge for providing access to said central cavity,

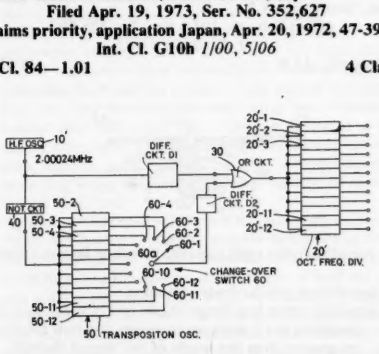
a pressure roller rotatably mounted in said central cavity and arranged transversely relative to said support means, a counter roller rotatably mounted in said central cavity and positioned transversely relative to said support means in spaced underlying relation with said pressure roller, and

means for vertically adjusting the position of said pressure roller in said central cavity relative to said lateral opening to permit introduction of said blanks on said punching knife through said lateral opening into compressive relationship with said pressure roller.

3,877,337
ELECTRONIC MUSICAL INSTRUMENT CAPABLE OF TRANSPOSITION

Nobuharu Obayashi, Shizuoka-ken, and Tetsuzi Sakashita, Hammatsu, both of Japan, assignors to Kabushiki Kaisha Kawai Gakki Seisakusho, Shizuoka-ken, Japan

Filed Apr. 19, 1973, Ser. No. 352,627
Claims priority, application Japan, Apr. 20, 1972, 47-39103
Int. Cl. G10h 1/00, 5/06
U.S. Cl. 84—1.01 4 Claims

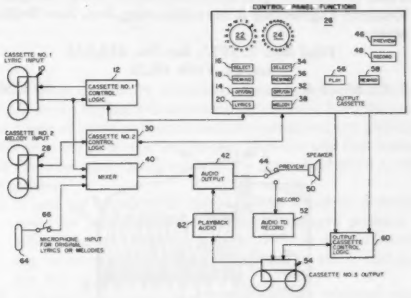


1. An electronic musical instrument capable of transposition comprising a high frequency oscillator having an output side, an octave frequency divider including twelve counter circuits to generate twelve tone signals, a transposition oscillator including a plurality of counter circuits coupled between the output side of said oscillator and said divider, means to control the addition of the frequency of the output of said high frequency oscillator to the frequency of the output of the transposition oscillator to generate an input frequency for the octave frequency divider, said means including a NOT circuit coupled between said oscillators and an OR circuit coupled between said high frequency oscillator and divider, and a selector switch between the transposition oscillator and said OR circuit.

3,877,338
METHOD AND SYSTEM FOR COMPOSING MUSICAL COMPOSITIONS

Mack David, 875 Comstock Ave., Los Angeles, Calif. 90024

Continuation of Ser. No. 377,081, July 6, 1973, abandoned.
This application Apr. 19, 1974, Ser. No. 462,518
Int. Cl. G10g 1/00
U.S. Cl. 84—453 5 Claims



1. An electronic system for composing a variety of different songs comprising:

first and second sound playback units;

a lyric storage medium having a plurality of lyric groups recorded thereon in a first sequential order for audible reproduction by said first playback unit, each of said lyric groups having a plurality of discrete lyric phrases recorded therein with all of the said lyric phrases within any one of said lyric groups having the same meter, the same recording time length, and being configured to interfit in structure and meaning with any one of the lyric phrases in an adjacent lyric group when associated in said first sequential order;

first location addresses recorded on said lyric medium identifying the lyric groups and the lyric phrases within said lyric groups;

a melody storage medium having a plurality of melody groups recorded thereon in a second sequential order for audible reproduction by said second playback unit, each of said melody groups having a plurality of discrete melody phrases recorded therein with all of the said melody phrases within any one of said melody groups having the same meter, the same recording time length, and being configured to musically interfit with any one of the melody phrases in an adjacent melody group when associated in said second sequential order;

second location addresses recorded on said melody medium identifying the melody groups and the melody phrases within said melody groups;

the lyric phrases in any lyric group having the same meter and recording time length as the melody phrases in the correspondingly addressed melody group;

electronic control means operatively connected to said first and second playback units comprising:

selection switches for selecting a location address corresponding to said first and second location addresses;

control logic means responsive to said selection switches for automatically positioning the correspondingly addressed lyric or melody phrase in said first or second playback unit, respectively, for playback;

playback control measn actuating said first or second playback unit for audibly reproducing the selected lyric or melody phrase, said playback control means further including means selectively actuating both said first and second playback units simultaneously for audibly reproducing in synchronism said selected lyric and melody phrases;

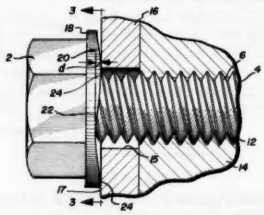
mixer means for combining said synchronously reproduced lyric and melody phrases; and

a third playback unit responsive to said mixer means for recording said combined lyric and melody phrases.

3,877,339
LOBULAR SCREW WITH MEANS FOR IMPROVED STRESS DISTRIBUTION

Herman G. Muenchinger, South Dartmouth, Mass., assignor to Research Engineering & Manufacturing, Inc., New Bedford, Mass.

Filed Dec. 7, 1973, Ser. No. 422,833
Int. Cl. F16b *39/26*
U.S. Cl. 85—9 R **10 Claims**



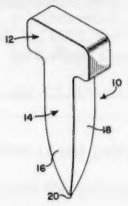
1. A screw comprising a head end and a thread shank extending axailly from said head end, the thread on said shank having a number of circumferentially spaced lobes and intermediate sides which recede from the lobes such that the normal engagement of said screw thread with a mating thread of circular cross-section is substantially localized at said lobes as the screw is driven into the mating thread, and means at said head end forming an axially presented surface for bearing against a member to be retained by said screw, said bearing surface having circumferentially spaced recesses presented toward said shank and with the recesses being substantially aligned with said lobes, and said bearing surface also having ridges circumferentially intermediate said recesses and shaped such that tightening of the screw causes said ridges to engage said member to be retained and impose pressure thereon and said recesses provide relief to permit axial movement of the screw upon further tightening to increase the areas of pressure flank engagement of the screw thread with the mating thread.

3,877,340
CONCRETE PENETRATING PIN

Friedrich Karl Knohl, Roselle, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Dec. 26, 1973, Ser. No. 428,590
Int. Cl. F16b *15/00*
U.S. Cl. 85—28 **1 Claim**

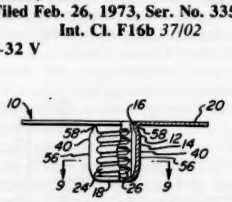
1. A fastener device for penetration of steel and a concrete support surface utilizing relatively low velocity and driving energy, including a shank portion and enlarged driving head portion, the shank having a rectangular cross-sectional configuration along its entire length and formed by four longitudinal side surfaces all of which present surfaces which are substantially linear in a direction transverse the axis of the fastener, four longitudinally extending corners formed by the intersection of the side surfaces and functioning as longitudinal cutting edges to facilitate entry of the fastener into the concrete, the shank including an entering and trailing portion, the trailing portion being directly beneath the head with the longitudinal side surfaces thereof being substantially parallel to the longitudinal axis of the shank, the entering portion forming a workpiece penetrating point by the convergence of all longitudinal side surfaces to a substantially sharp point, the four longitudinal side surfaces forming the entering portion being curvilinear in the direction of the axis of the shank and providing outwardly arcuate surfaces from the trailing portion to the substantially sharp point, the entering portion having an axial extent at least as great as the axial extent of the trailing portion, the driving head portion having a thickness and length with the thickness being equal to the thickness of the shank and the length of the head formed by integral ears extending laterally to either side of the shank providing workpiece engaging surfaces, the total axial extent of the fastener device being generally one-half inch, the total shank length being generally three-eighths inch, and the length of said entering portion being approximately one-fourth inch and the width and thickness of the shank being generally not greater than one-sixteenth inch thereby allowing the fastener to penetrate the steel to an anchoring depth in the concrete without requiring substantial driving energy.



3,877,341
ULTRA-LIGHTWEIGHT METALLIC THREADED FASTENERS

David W. Grimm, deceased, late of Madison, N.J.; by Betty Ann Grimm, executrix, Watchung, and Michael F. Mihaly, Madison, both of N.J., assignors to Amerace Esna Corporation, New York, N.Y.

Filed Feb. 26, 1973, Ser. No. 335,502
Int. Cl. F16b *37/02*
U.S. Cl. 85—32 V **8 Claims**



1. An ultra-lightweight metallic threaded fastener comprising:

a thin-walled tubular body including

a radially extending flange at one end of the tubular body;

threaded body portions in which the wall thickness is no greater than the depth of the thread therein;

effectively unthreaded body portions unitary with the threaded body portions and extending axially along the body for reinforcing the tubular body against axial

loading, the unthreaded body portions including at least two reinforcing ribs projecting radially outwardly beyond the radial extent of the threaded body portions and extending axially between the flange and the opposite end of the tubular body;

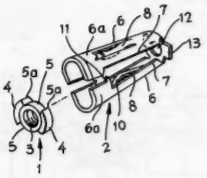
the radial extent of each rib being greatest at a location spaced axially from the flange toward said opposite end and decreasing between said location and the flange to provide an indentation adjacent the flange; and

a radially outwardly extending protuberance in the tubular body located circumferentially between the reinforcing ribs at said opposite ends.

3,877,342
CAGE NUTS

Bernard Charles Duchatellier, Paris, France, assignor to Rapid S.A., Paris, France

Filed Mar. 8, 1973, Ser. No. 339,249
Claims priority, application France, July 6, 1972, 72.24524
Int. Cl. F16b *13/04*
U.S. Cl. 85—75 **4 Claims**



1. A cage-nut for use with a panel having a blind bore therein, said cage-nut comprising:

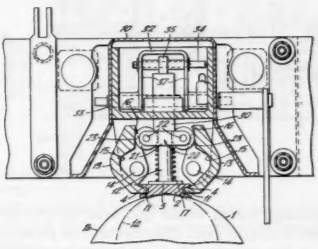
a one-piece generally U-shaped cage for insertion base end first into said bore, said cage comprising a base having an aperture therein and two generally semi-circular arms folded concave side-to-concave side to define a caged nut receiving cavity substantially coaxial with said aperture, said arms defining an axially extending pair of slots between the opposed edges of said arms along a portion of their axial extension, each arm having an axially extending tongue attached at the end closest the base, the free end of the tongue bent outwardly to form an outwardly extending barb and the portion of the tongue between the free end and the attached end being bent inwardly to extend into the caged nut receiving cavity at a point axially coincident with a portion of said axially extending slots, said base including a pair of radially outwardly extending wings thereon to prevent rotation of said cage in said bore; and

a caged nut received in said caged nut receiving cavity, said caged nut having a pair of projections on the periphery thereof for receipt in and cooperation with said axially extending slots to allow axial movement of said nut along said axially extending slots while rotationally fixing said nut to said cage, said tongues biasing said caged nut to the axial portion of said slots closest said base, said nut upon axial movement in said slot towards the free ends of said arms being effective to force said tongues out of said cavity and to force said outwardly extending barbs into said blind bore.

3,877,343
STORES CARRIERS

Cyril Newell, Odiham; Mark Philip Gray Walden, Blacknest, near Alton, and John Stephen Yeomans, Cove, all of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Dec. 29, 1972, Ser. No. 319,809
Claims priority, application United Kingdom, Dec. 31, 1971, 60935/71
Int. Cl. B64d *1/04;* **F41f** *5/00*
U.S. Cl. 89—1.5 R **4 Claims**



1. A store carrier for releasably engaging a lug secured to a store which lug has a first surface facing away from the store and a pair of inclined second surfaces symmetrically disposed relative to the store axis and located between said first surface and the store, and facing towards the store, said store carrier comprising:

a. a first lug engagement means having a pair of pivotably mounted jaws movable between an engaged position in which each jaw engages a respective one of said second lug surfaces and a disengaged position in which said jaws are free of lug;

b. a second lug engagement means having a member engagable with said first lug surface and movable in a direction normal to the store axis; and

c. a mechanism for providing a self tightening crutch load upon the lug having first and second relatively movable portions of one of said lug engagement means, said portions having respective surfaces in opposed relationship and being movable apart to tighten the engagement of one of said engagement means with the lug, and movably mounted means biased for movement between said opposed surfaces in a given direction, said biased movably mounted means and said opposed surfaces being shaped to cooperate so as to provide a wedging action to move said first and second portions increasingly apart in response to movement of said biased movably mounted means in said given direction whereby the crutch load on the lug is tightened.

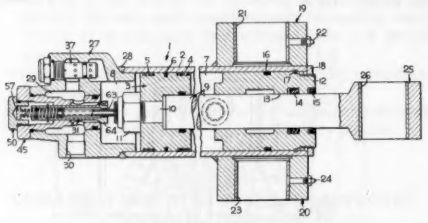
3,877,344
CUSHIONED HYDRAULIC ACTUATOR

Herbert Z. Langland, Topeka, Kans., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Mar. 2, 1973, Ser. No. 337,531
Int. Cl. F15b *15/22*
U.S. Cl. 91—406 **10 Claims**

1. A hydraulic actuator comprising a cylindrical housing, a head fastened to the end of said cylindrical housing defining a valve chamber communicating with a flow port, a piston slidably received within said cylindrical housing and forming an expansible chamber with said head, a removable valve cartridge mounted in said head including a valve body defining a valve seat, a valve element slidably mounted within said valve body and defining a poppet valve with said valve seat in said body, fastening means on said head and valve cartridge

removably fastening said valve cartridge in said valve chamber said valve cartridge controlling fluid flow between said expansible chamber and said valve chamber conduit means through said valve body interconnecting the internal and external portions thereof, means defining an orifice providing restrictive fluid passage across said poppet valve and communicating said expansible chamber with said valve chamber via said conduit means, a relief valve, means supporting said relief valve in said head and passage means within said head communicating said expansible chamber with said relief valve and



further passage means within said head communicating said relief valve with said valve chamber to limit peak pressures in said expansible chamber, resilient means interposed between said valve body and said valve element normally biasing said valve element to an open position, a valve actuating plunger, resilient means interposed between said valve element and said plunger, said plunger engaging said piston to close said poppet valve and provide restrictive fluid flow through said orifice when said piston nears the end of its stroke and thereby cushioning the movement of the piston by restricting the flow of fluid from said expansible chamber.

3,877,345

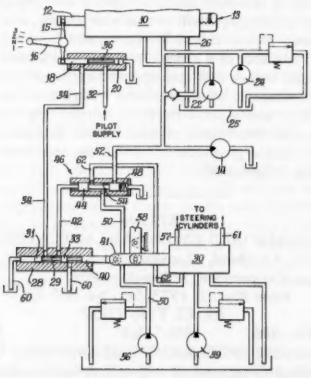
DISPLACEMENT SENSITIVE AUTOMATIC DIVERTER VALVE

Edward J. Ohms, Washington, and Lawrence F. Schexnayder, Joliet, both of Ill., assignors to Caterpillar Tractor Company, Peoria, Ill.

Filed Nov. 19, 1973, Ser. No. 416,955

Int. Cl. F15b *11/16*

U.S. Cl. 91—412 **10 Claims**



1. A fluid control system for controlling flow of pressure fluid from first and second pump means to first and second fluid motor means for driving said motor means including; first fluid communication means for communicating fluid from said first pump means to said first fluid motor means, second fluid communication means for communicating fluid from said second pump means to said second fluid motor means, said first fluid communication means including first control valve means for controlling fluid flow to said first motor means and for controlling the speed of operation of said first motor means, second control valve means for controlling the amount of fluid flow to said second motor means, diverter means for selectively diverting some fluid flow from said second fluid communication means to said first fluid communication means, said diverter means including sensing valve means and mechanical linkage means between said sensing valve means and said second control valve means for directly mechanically transmitting movements of said second control valve means to said sensing valve means for automatically conditioning said diverter means to redirect diverted fluid from said first fluid communication means to said second fluid communication means in response to movement and positioning of said second control valve means.

3,877,346

ELECTRO-HYDRAULIC ACTUATION SYSTEM WITH REDUNDANCY OPERATION, SUPERVISION AND EMERGENCY OPERATION

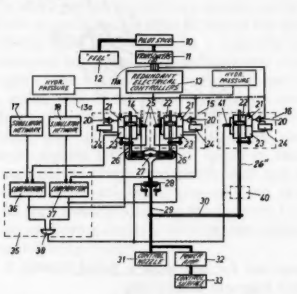
Hans-Jurgen Koopmann, and Eike Schmidt, both of Bremen, Germany, assignors to Vereinigte Flugtechnische Werke-Fokker GmbH, Bremen, Germany

Filed Mar. 25, 1974, Ser. No. 454,235

Claims priority, application Germany, Mar. 30, 1973, 2315906

Int. Cl. F15b *11/16, 20/00*

U.S. Cl. 91—411 R **6 Claims**



1. A control system with redundant actuator operation, comprising:

a plurality of individual actuators, each including a hydraulic drive with servo valve control, electrical input for control of the valve, and a displaceable output device being displaced in response to actuator operation;

means including a common output device connected to all of said output devices for providing a common actuator output as displacement of the common output device;

means connected for providing control signals to the actuators of the plurality of individual actuators to obtain combined operation of them for displacing said common output device;

an additional actuator not included in the plurality of individual actuators and having a hydraulic drive, electrical input for control of the hydraulic drive and a displaceable output device, the input being operatively connected to receive control signals from the means of providing, the additional actuator being normally operatively disconnected from the common output device;

a plurality of means respectively for deriving from each actuator a signal representing the operation of the actuator in response to the control signal it receives;

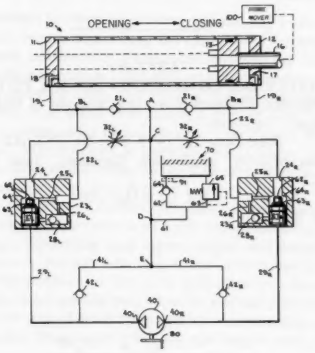
means connected to receive also the control signal and constructed for simulating operation of the actuators and providing output signals representative thereof; and

supervising means connected to the means for simulating and to the plurality of means for deriving to provide a second control signal in representation of a complete drop out of all actuators of the plurality, for causing said additional actuator to be operatively connected to said output device.

3,877,347
HYDRAULIC CONTROL

John M. Sheesley, Houston; Ronald A. Gulick, Sugarland, and Robert M. McEver, Jr., Houston, all of Tex., assignors to Research Engineering Company, Houston, Tex.

Filed Mar. 13, 1973, Ser. No. 340,654
Int. Cl. F15b *13/04*
U.S. Cl. 91—438 **3 Claims**



1. A device for controlling the operation of an external member, said device comprising the following:

a cylinder, for containing fluid, said cylinder containing a movable piston therein, said piston being joined to a piston rod which rod extends at least partially without said cylinder;

first fluid conduit means linking one end of said cylinder with said cylinder's other end, said first conduit means including spaced first and second one way check valves, said check valves each restricting fluid flow in opposite directions to each other;

second fluid conduit means, communicatingly connected in parallel to said first fluid conduit means, and across said first and second check valves, said second fluid conduit means including spaced first and second flow regulating valves;

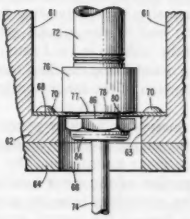
means for fluid communication between said first and second conduit means, said communication means extending from intermediate said flow regulating valves to intermediate said check valves; and

third fluid conduit means communicatingly connected in parallel to said second fluid conduit means, said third means including spaced first and second means for removably blocking fluid flow through said second and third fluid conduit means, and an auxiliary pump in said third conduit means in communication with both of said fluid blocking means, whereby upon said pump being operated, one of said blocking means acts to block said second conduit means and permit pumped fluid in said third conduit means to flow to said cylinder via a portion of said second and first conduit means.

3,877,348
LINEAR THRUSTER

William C. Sandlin, 708 First National Bldg., Waco, Tex. 76701

Continuation-in-part of Ser. No. 169,933, Aug. 9, 1971, Pat. No. 3,788,196. This application July 2, 1973, Ser. No. 375,945
Int. Cl. F01b *15/00, 29/00*
U.S. Cl. 92—13 **9 Claims**



1. A linear thruster comprising:

a housing,

a plurality of spaced parallel guide rods supported by said housing for sliding axial movement with respect to said housing,

a thrust plate attached to said guide rods and movable therewith,

means for moving said thrust plate comprising a drive rod attached to said thrust plate and a power unit operatively connected to said drive rod for moving said drive rod,

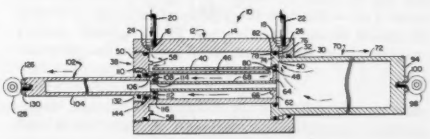
a spring plate attached to said housing, said spring plate having an opening through which a portion of said power unit extends, said opening having a radius greater than the radius of said power unit at corresponding points where said power unit extends therethrough whereby said power unit is free to move radially in said opening with respect to said spring plate,

attachment means for loosely attaching said power units to said spring plate, said attachment means comprising first and second opposed surfaces, said first surfaces being attached to said power unit on one side of said spring plate, said second surface being attached to said portion of said power unit extending through said opening and being positioned on the other side of said spring plate, said first and second surfaces being spaced apart a predetermined distance greater than the thickness of said spring plate, whereby said power unit is free to move angularly and axially in said opening with respect to said spring plate.

3,877,349
DUAL OPPOSITE MOTION EXTENDING AND RETRACTING RAM FLUID CYLINDERS

Arnold Schindel, Fairlawn, N.J., assignor to The Singer Company, Little Falls, N.J.

Filed May 15, 1974, Ser. No. 469,942
Int. Cl. F01b *7/20*
U.S. Cl. 92—53 **5 Claims**



1. A fluid cylinder comprising:

an outer housing including a tubular portion having an open first end and a radially inward extending flange defining a central opening at the second end thereof;

an inner housing including a tubular portion having a flange at a first end thereof for engagement with the open first end of the tubular portion of the outer housing,

the tubular portion of the inner housing extending from the flange into the interior of the outer housing,

the flange on the inner housing maintaining the tubular portion of the inner housing and the tubular portion of the outer housing in a spaced relation, and

a section extending radially inward at the second end of the tubular portion of the inner housing defining an orifice; a fluid transmission tube extending from the orifice toward the first end of the tubular portion of the inner housing with the radially inward extending section of the inner housing maintaining the fluid transmission tube and the tubular portion of the inner housing in a spaced relation;

an outer ram having an annular piston portion slideably disposed between the outside diameter of the tubular portion of the inner housing and the inside diameter of the tubular portion of the outer housing, and

a tubular portion extending from the piston exteriorly in a first direction through the central opening at said second end of the outer housing and terminating in a closed exterior end,

the outer ram dividing the space between the inner housing and the outer housing into a first chamber, a second chamber, and a third chamber;

an inner ram having an annular piston portion slideably disposed between the inside diameter of the tubular portion of the inner housing and the outside diameter of the fluid transmission tube, and

a tubular portion extending from the piston of the inner ram exteriorly in a second direction and terminating in a closed exterior end,

the inner ram dividing the space between the fluid transmission tube and the inner housing into a fourth chamber, a fifth chamber, and a sixth chamber;

an extension fluid path means for fluidly coupling the second chamber and the fourth chamber with an external pressurized fluid flow; and

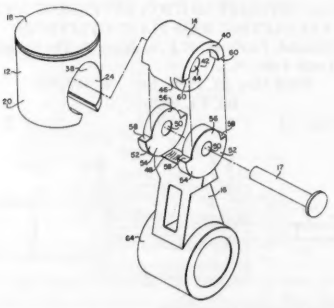
a retraction fluid path means for fluidly coupling the first chamber, the third chamber, the fifth chamber, and the sixth chamber with the external pressurized fluid flow.

3,877,350

PISTON AND CONNECTING ROD ASSEMBLY

Robert W. Earley, Worthington, Ohio, and Delmar R. Riffe, Murrysville, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 29, 1973, Ser. No. 420,333
Int. Cl. F16j *1/14*
U.S. Cl. 92—187 **7 Claims**



1. The combination of the piston and connecting rod comprising:

a piston having a head, a skirt, and a bottom end, and having a uniform diameter bore extending therethrough from one skirt face to the opposite skirt face with the lower part of the bore being open along its length to a generally trough-shaped space which is downwardly open and is defined by outwardly flaring walls extending to said bottom end of said piston; and

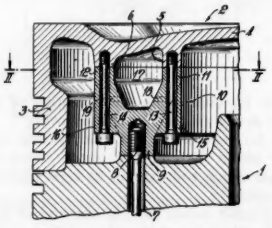
a connecting rod—wrist pin assembly including an upper end journal portion to be received in said bore, said upper end journal portion comprising a one piece rod portion having spaced apart upstanding ears at opposite sides of the upper end of said rod portion, and a separate, generally cylindrically-shaped piece with recessed end portions complementary in shape to said ears so that as assembled said upstanding ears and said separate piece form said journal portion, with the journal portion having a uniformly curved circumference throughout at least that portion of the journal portion which is presented in facing relation to the surfaces of said bore, and means for retaining said rod portion and said separate piece in assembled relation.

3,877,351

INTERNAL COMBUSTION ENGINE PISTON

Eugen Barfiss, Stuttgart, Germany, assignor to Mahle GmbH, Stuttgart, Germany

Filed June 22, 1973, Ser. No. 372,642
Claims priority, application Germany, June 23, 1972, 2230722
Int. Cl. F16j *1/00*
U.S. Cl. 92—220 **1 Claim**

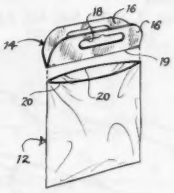


1. An internal combustion engine piston including a lightweight metal lower part comprising the piston skirt, a piston crown connected with the piston skirt and comprising the upper part of the piston, which piston crown is formed from steel, two concentric integral annular ribs projecting from the inside face of the piston crown, a piston ring zone surrounding the piston crown, a cross-sectionally Y-shaped bifurcated annular intermediate ring of cast iron located between the upper and lower piston part, said ring including fork parts mating with said annular ribs respectively and a base part mating with said lower piston part, at least one tube formed on each fork part of the ring, an expanding screw provided in each tube for bolting the two fork parts of said intermediate ring to the annular ribs, and further screws in a single circular arrangement located in the piston skirt and connected to said base part for bolting the base part of the intermediate ring to the lower part of the piston.

3,877,352
METHOD FOR PRODUCING THERMOPLASTIC BAG WITH HANDLE

Bernard F. Brieske, Palatine, Ill., assignor to Vision Wrap Industries, Inc., Palatine, Ill.

Filed July 5, 1973, Ser. No. 376,681
Int. Cl. B31b *1/86*
U.S. Cl. 93—35 H **1 Claim**

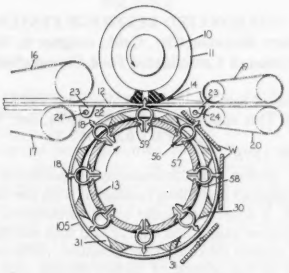


1. A method for forming a thermoplastic bag having handle and closure means comprising the steps of die-cutting a cardboard blank, cutting slits along a line dividing the blank, said line providing a foldline, said slits including short connecting portions remaining along said foldline to maintain said strip in an assembly, said blank comprising a pair of wide strip portions on opposite sides of said foldline, the folded blank disposing said strip portions in overlying relationship and comprising bottom parallel edges defined by said foldline, said die cutting step also including the die cutting of handle openings into each strip portion, said bag including substantially overlying opposing wall portions with each wall portion defining an upper edge, separating said upper edges and locating said upper edges in contact with respective bottom parallel edges of said strip portions in the area immediately adjacent said foldline, and heat sealing said edges to said strip portions, and including the step of separating said short connecting portions by pulling the strips apart whereby said bag is ready for use.

3,877,353
STRIPPING DEVICE

Walter S. Smith, Naperville, and Joseph E. Mazur, Chicago, both of Ill., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Nov. 12, 1973, Ser. No. 414,912
Int. Cl. B31b *1/74*
U.S. Cl. 93—36 A **6 Claims**

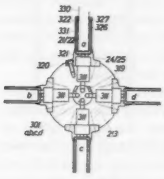


1. Stripping apparatus for separating waste pieces from pre-creased material comprising, a rotatable cylinder, stripper means mounted on said cylinder and having tips projecting radially beyond the surface of said cylinder, roller means mounted adjacent said cylinder and defining therewith a stripping nip, said roller means being adapted to coact with said stripper means to impale the waste pieces on the tips thereof as the sheet material moves through said stripping nip, a hollow drum telescoped over said cylinder, said hollow drum being coextensive axially with said cylinder and having apertures in the surface thereof in selected positions coinciding with the location of the stripper means on said cylinder, and means mounting said drum for independent rotation in unison with said cylinder about a fixed axis eccentric with respect to the cylinder axis whereby said drum surface is located intermediate the cylinder surface and the tips of said stripper means in the area of the stripping nip and is spaced radially outwardly beyond the tips of said stripper means in an area spaced from said stripping nip.

3,877,354
REVOLVER FOR A PACKAGING MACHINE

Alfred Schmermund, Kornerstrasse 62, 5820 Gevelsberg, Germany

Filed Nov. 8, 1973, Ser. No. 413,995
Claims priority, application United Kingdom, Nov. 30, 1972, 55334/72
Int. Cl. B31b *1/12, 1/32*
U.S. Cl. 93—44.1 R **3 Claims**



1. A revolver for use as part of a packaging machine for wrapping block-shaped articles in packaging material, the revolver comprising in combination:

a support;

a shaft mounted on said support to be rotatable about the longitudinal axis of said shaft;

article receiving means connected to said shaft to rotate therewith;

cavity defining means provided by wall members of said article receiving means to define a plurality of cavities spaced at angular intervals about said axis and extending in a generally radial direction relative to said axis;

perforate members in each said cavity in spaced relationship with said wall members of the respective said cavity to define cells, each bounded by said perforate members and each adapted to receive one said article, and to define in each said cavity a chamber between said perforate members and said wall members, the dimensions of each said cell being greater in a directional radial of said axis than in a direction tangential—at said cell — to a circle passing through all of said cells, said circle having its centre on said axis and being disposed in a plane perpendicular to said axis;

a source of vacuum pressure;

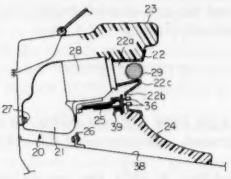
an equal plurality of longitudinally extending passages defined in said shaft, each said longitudinal passage communicating with a respective one of said chambers; and

valve means co-rotational with said shaft, said valve means selectively connecting each said longitudinal passage to said source on the respective one of said chambers being located within a predetermined range of angular positions relative to said axis.

3,877,355
AUTOMOTIVE AIR CONDITIONER ASSEMBLY

Mitsuru Iizuka, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed May 22, 1974, Ser. No. 472,368
Claims priority, application Japan, May 23, 1973, 48-61156
Int. Cl. B60h 1/24
U.S. Cl. 98—2 4 Claims



1. An air conditioner assembly for a motor vehicle having a passenger compartment including an instrument panel, a console box and an air conditioner mounting opening formed between said instrument panel and said console box, the air conditioner assembly having:

a temperature regulating unit fixedly mounted on a body structure of the vehicle for supplying air to the passenger compartment under controlled conditions;

a control casing fitted into the opening and secured to the instrument panel and the console box and divided into an upper space and a lower space by means of a transverse partition of the casing;

a cover plate covering the lower space;

an air duct connecting the temperature regulating unit to the end open into the upper space of the casing;

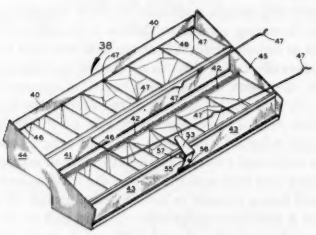
said assembly being characterized in that:

an elongate support body is pivotally connected to a wall of the temperature regulating unit at one end and securely fixed to the instrument panel, the console box and the control casing at the other end and that the cover plate is fixedly carried by the fixed end of said elongate support body.

3,877,356
VARIABLE AIR DISTRIBUTION SYSTEM

Herbert F. Bruns, 3520 Segovia St., Coral Gables, Fla.

Filed Sept. 5, 1972, Ser. No. 286,413
Int. Cl. F24f 13/06
U.S. Cl. 98—40 D 4 Claims

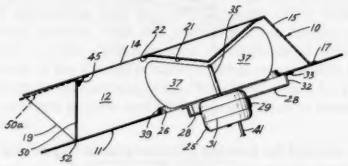


1. An air projection grille for wall and/or ceiling mounting and connection with an air duct, said grille comprising a frame having four sides defining an elongated opening, a series of displaceable modules being positionable within said opening to project air in predetermined patterns for integration with ambient air in rooms of varying sizes and shapes, said modules being positionable adjacent one another in the front of the grille and each module having parallel sides with a transverse deflection surface leading to an outlet between said sides, said series of modules having deflection surfaces mounted at different angles with respect to one another and side-by-side V-shaped outlets formed between said surfaces to project air at preselected and different angles through said outlets.

3,877,357
HINGED DOOR STRUCTURE AND VENTILATORS INCORPORATING THE SAME

John V. Felter, and Kenneth M. Rudine, both of 1307 Ashland, Houston, Tex. 77008

Filed Jan. 2, 1973, Ser. No. 320,101
Int. Cl. F24f 7/06
U.S. Cl. 98—43 7 Claims



1. Door assembly, comprising a door member of flat form disposed in a generally vertical direction when closed and having a rearwardly depending flange along its upper edge at an angle not exceeding 90° therewith, wall means disposed transversely rearwardly of said door member uniformly closely spaced from the angle between said door member and said flange, strip means connected at one edge to said wall means rearwardly of said door and shaped angularly downwardly toward said door member and then vertically upwardly to terminate at its opposite edge extending beneath the angle of said flange with said door member, the space between said opposite edge of said strip means and said wall means being less than the rearward extent of said flange from said door member, said door member being pivotally movable forwardly from said closed position to an open position adjacent said wall means by sliding movement of the rear surface of said door member over said opposite edge of said strip means, said flanged edge of said door member preventing removal of said door member in all pivotal positions thereof, the flanged edge of said door member being sufficiently long from the angle of said flange with said door member to the edge of said flange as to engage the angularly downward portion of said strip means when said door member is opened to limit the inward movement of said angle to prevent said door member from becoming locked in open position.

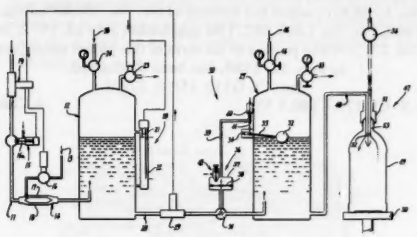
3,877,358
CARBONATED BEVERAGE SYSTEM

Fred A. Karr, Redwood City, Calif., assignor to Shasta Beverages Division of Consolidated Food Corporation, Hayward, Calif.

Division of Ser. No. 264,343, June 19, 1972, Pat. No. 3,832,474. This application Mar. 27, 1974, Ser. No. 455,182
Int. Cl. C02d 1/02
U.S. Cl. 99—275 8 Claims

1. In a system for continuously preparing a carbonated beverage product and filling containers with the same, a stabilizing tank, a source of liquid to be carbonated, a line connected between said liquid source and said stabilizing tank, a source of carbon dioxide under pressure, carbonating means connected to said source of carbon dioxide and disposed in said line for applying carbon dioxide to flowing liquid to be carbonated to form a carbonated product before entry into the stabilizing tank, first valve means disposed between said stabilizing tank and a source of carbon dioxide under pressure for regulating the head pressure of carbon dioxide over carbonated product in said stabilizing tank, a pressure reduction tank, a line connected between said stabilizing tank and said pressure reduction tank, second valve means connected to said pressure reduction tank for regulating the head pressure

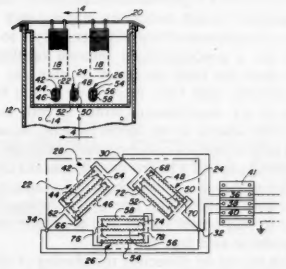
of carbon dioxide over carbonated product in said tank, a filler for dispensing carbonated product, a line directly connected between said pressure reduction tank and filler providing open communication therebetween so that the pressure in said filler is determined by the head pressure in the pressure reduction tank.



3,877,359
ELECTRIC DEEP FAT FRYER WITH CONTROLLED HEAT DURING START-UP

Richard T. Keating, 715 S. 25th Ave., Chicago, Ill. 60104

Continuation-in-part of Ser. No. 420,100, Nov. 29, 1973, abandoned. This application Oct. 4, 1974, Ser. No. 512,130
Int. Cl. A47j *37/12*
U.S. Cl. 99—331 **2 Claims**

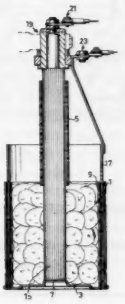


1. A fat-melting electric deep-fat fryer having low-high heating modes for fat melt and fat fry operations comprising an upstanding body having a receptacle opening to the top thereof; a control panel mounted on the fryer body; baskets for containing the food pro ct to be fried hanging from means supported on the upper edge of the said receptacle; a power circuit comprising first, second and third heating elements traversing across and adjacent to the bottom of the receptacle in side-by-side relation and electrically connected to 220-volt A.C. three-phase electrical power supply mounted on a terminal block; a heating control circuit comprising two-way switch means mounted on the control panel for switchover of the heating elements of the power circuit from series circuit hook-up for the melt operation to parallel circuit hook-up of the same for fry operation; first, second and third relay-actuated switches for each of the first, second and third legs of the delta hook-up electrically connected to the said two-way switch means for switchover of the power circuit from series-circuit heating element hook-up for the fat melt operation to parallel circuit hook-up for the fat fry operation; and a main thermostat operatively connected in the circuit along with the two-way switch means between the power supply and the first, second and third relay-actuated switches for regulating the temperature of the fat in the fryer receptacle during fry operation.

3,877,360
CONTAINER FOR THE TREATMENT OF THE CONTENTS BY PASSING ELECTRIC CURRENT THERETHROUGH

Knut Birger Vigerstrom, Stockholm, Sweden, assignor to Electro-Food AB, Solna, Sweden

Filed Sept. 27, 1972, Ser. No. 292,787
Claims priority, application Sweden, Sept. 29, 1971, 12342
Int. Cl. H05b *3/60*
U.S. Cl. 99—358 **9 Claims**



1. A container for heating foodstuff contained therein comprising:

a. an electrically conductive wall forming an enclosure for the foodstuff and adapted to be connected to an electrical supply source to thereby form a first electrode;

b. a bottom having an electrically insulating inner surface;

c. an electrically insulating inner wall disposed between said electrically conductive wall and the foodstuff for preventing direcct contact of said electrically conductive wall with the foodstuff; and

d. a channel member of insulating material disposed within said enclosure for receiving a second electrode adapted to be connected to said electrical supply source and for preventing the second electrode from contacting and thereby damaging the foodstuff when inserted into said enclosure, said channel member and said insulating inner wall each being provided with a plurality of perforations so that liquid within said enclosure may thereby contact the first and second electrodes to provide an electrical connection enabling the foodstuff to be heated when current is passed between the first and second electrodes.

3,877,361
LIQUID SMOKE SPRAY CABINET

James E. Trainor, and Thomas J. Haug, both of Manitowoc, Wis., assignors to F. C. Heiden, Inc., Manitowoc, Wis.

Filed Apr. 2, 1973, Ser. No. 348,016
Int. Cl. A23b *1/04*
U.S. Cl. 99—478 **13 Claims**

1. A device for treating meat with liquid smoke comprising, in combination:

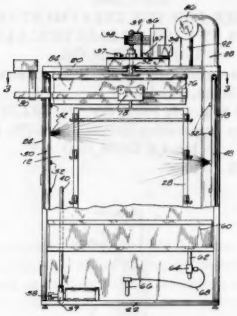
a cabinet defining a treatment chamber;

a carrier located inside said treatment chamber and adapted to receive and support a rack carrying the meat to be treated;

a plurality of spray means inside said treatment chamber for directing a spray of liquid smoke onto the outer surface of the meat being treated;

a liquid smoke supply system including a pump means for selectively supplying liquid smoke to said spray means;

drive means for imparting an oscillating movement to said carrier and thereby impart a jarring action on the meat so



as to enhance removal of excess liquid smoke therefrom; and

blower means for selectively applying a flow of pressurized air over the outer surface of the meat being treated.

3,877,362

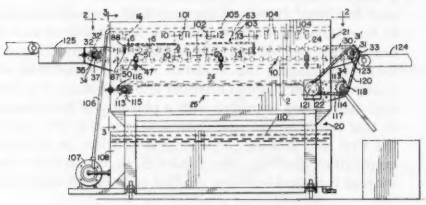
METHOD AND MACHINE FOR REMOVING SHELLS FROM HARD COOKED EGGS

Jacob J. Epstein, and Lawrence R. York, both of Topeka, Kans., assignors to Seymour Foods, Inc., Topeka, Kans.

Filed Mar. 20, 1973, Ser. No. 342,968

Int. Cl. A47j *43/00*

U.S. Cl. 99—570 **28 Claims**



1. A hard cooked egg shelling machine comprising a roller conveyor disposed in a supporting frame with the rollers shaped and spaced so as to provide egg accommodating pockets between each roller and the next succeeding roller, the conveyor having a horizontally disposed run on which the eggs are carried and rotated about their long axes, a series of pressure applying pad members spaced above said conveyor run so that they apply predetermined pressure to eggs rolling beneath the same, certain of said pressure applying pad members having means on the egg engaging bottom face for crushing each shell on a circumferential line, and nozzles associated with said pressure applying pad members for flushing the eggs with a liquid so as to assist in the release of the crushed shell portions from the eggs and discharge the shell portions from the machine.

3,877,363

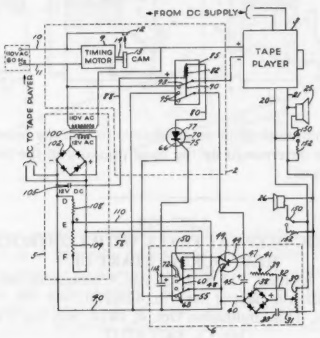
ELECTRONIC SOUND EFFECTS APPARATUS

Arthur R. Parilla, 34 Crestview Rd., Mountain Lakes, N.J. 07046

Continuation-in-part of Ser. No. 227,247, Feb. 17, 1972, Pat. No. 3,708,632, which is a division of Ser. No. 750,030, Aug. 5, 1968, Pat. No. 3,644,682. This application July 13, 1972, Ser. No. 271,299The portion of the term of this patent subsequent to Feb. 22, 1989, has been disclaimed.

Int. Cl. G11b *15/18, 27/22*

U.S. Cl. 179—100.1 VC **4 Claims**



1. Electronic sound effects, or timed announcement, apparatus comprising:

a tape-player, including a loud speaker, for use with tape having announcements sequentially pre-recorded thereon with unrecorded segments between them;

time responsive switch means for starting said tape-player by periodically connecting said tape-player to a source of power for a predetermined interval of time which is longer than the time necessary to play any of said announcements, said time responsive switch means comprising an a.c. synchronous motor directly connected to said power source to be driven thereby, a cam mounted on the output shaft of said motor whereby the cam rotates with the shaft, and a micro-switch operatively associated with the said cam so that the switch contacts are closed by the lobe of said cam, one switch contact being connected to said power source and the other contact being connected to said tape player;

run-switch means for detecting the playing of an announcement and for generating a signal in response thereto; and switch means, connected between said tape-player and said power source, responsive to the cessation of said signal for stopping said tape-player by disconnecting said tape-player from said power source.

3,877,364

METHOD FOR CONTINUOUS EXTRACTION OF LIQUID FROM A PASTY SUSPENSION

Guy Jacquelin, Grenoble, France, assignor to Centre Technique de l'Industrie des papiers, Cartons et Celluloses, Grenoble-Gare, Isere, France

Division of Ser. No. 47,037, June 17, 1970, Pat. No. 3,669,011. This application Sept. 20, 1971, Ser. No. 182,239

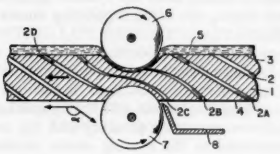
Int. Cl. A47j *19/02;* **B30b** *9/02*

U.S. Cl. 100—37 **4 Claims**

1. A process for extracting continuously liquid from a suspension containing solids by means of a belt having two parallel faces and a lengthwise dimension greater than its widthwise dimension; said belt being flat, flexible, deformable, liquid-tight and traversed in its thickness by conduits which place its two faces in communication permitting passage of the liquid from one face to the other; in which process:

a. a layer of the suspension is deposited on one of the faces of the said belt;

b. the belt, after the suspension is deposited as stated in step (a), is deformed by applying to its entire width a force of compression substantially perpendicular to its faces, thus effecting in the zone of compression a temporary obturation on a part of each conduit by constriction of said conduit;



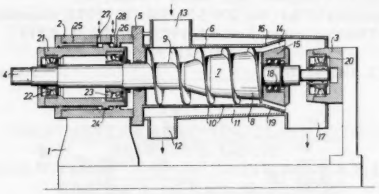
c. and causing the force of compression to advance in translation in the direction of the length of the belt so that the conduits have, at least at the place of the compression, an inclination with respect to the plane of the belt, and that their obturated portion is displaced from the end thereof in contact with the suspension layer to their opposite end thus causing a pumping effect which transfers the liquid from the suspension towards the opposite face of the belt.

3,877,365

ADJUSTABLE PRESSURE WORM PRESS

Lennart Berggren, Nassjo, Sweden, assignor to AB Krima Maskinfabrik, Nassjo, Sweden

Filed July 9, 1973, Ser. No. 377,210
Int. Cl. B30b *9/12, 15/00*
U.S. Cl. 100—117 **2 Claims**



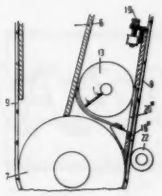
1. A worm press for the removal of liquid from a mixture of a solid and liquid, the press comprising a cylindrical strainer surrounding a rotatable worm, means for supplying the mixture to be pressed at the one end of the strainer and means for discharging the pressed solid at the other end of the strainer through an annular outlet opening surrounded by a wall which diverges in the direction of movement of the solid along the worm, wherein the worm has a core having portions of successively increasing diameter along a major part of its length so that the space between the core and the strainer decreases in the direction of movement of the solid along the worm, the worm is axially movable relative to the diverging outlet wall by hydraulic means during operation of the press and the inner periphery of the outlet opening is defined by a frusto-conical body which is freely rotatable relative to, but is axially movable with, the worm, said frusto-conical body having a smooth peripheral surface diverging from its axis at an angle not exceeding the angle of divergence of said outlet wall, which surface of said body is substantially flush with said worm core so as to substantially form an extension of said worm core.

3,877,366

PRESS FILTER

Theodorus Henderikus Holthuis, Veendam, Netherlands, assignor to Nivoba B.V., Veendam, Netherlands

Filed Dec. 28, 1973, Ser. No. 429,652
Int. Cl. B30b *9/20, 9/24*
U.S. Cl. 100—121 **11 Claims**



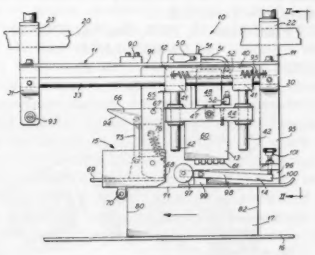
1. Press filter comprising a plurality of drums having a perforated cylindrical surface and adapted to rotate about parallel shafts, a closed, endless belt passing under pressure round a major part of each drum, feeding means for supplying pulp to be squeezed between each drum and the belt and members for discharging fluid from the drums and solids from behind each drum, characterized by members for removing solids from each cylindrical drum surface upstream from the point where the belt leaves the drum surface and by throttle members for maintaining at least the pressure on the squeezed solids which was exerted on the pulp until the solids have been removed from the drum surface.

3,877,367

DEVICE FOR PRINTING BOXES MOVING ON A CONVEYOR

Eugene R. Norwood, Downers Grove, Ill., assignor to Norwood Machinery & Equipment Co., Downers Grove, Ill.

Filed May 11, 1973, Ser. No. 359,273
Int. Cl. B41f *17/24*
U.S. Cl. 101—44 **11 Claims**

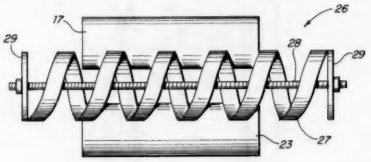


1. A device for printing indicia on a surface of a moving product which comprises an imprinting type mounted on a carriage, said carriage mounted for longitudinal movement on a support member, said carriage movable along said support member, said support member extending in the direction of movement of the product, means selectively contacting the moving product causing said carriage to move on said support with said product, actuating means actuated in dependent response to movement of the carriage for bringing the type into contact with the moving product, while the carriage is moving with the product, means for withdrawing the type from the product, and means for returning the carriage to an initial position after imprinting the product.

3,877,368
INK TRANSFER ROLLER FOR PRINTING PRESSES

Thomas M. Madigan, Pittsford, N.Y., assignor to Itek Corporation, Lexington, Mass.

Filed Dec. 8, 1972, Ser. No. 313,291
Int. Cl. B41f 7/36, 31/26
U.S. Cl. 101—148 3 Claims

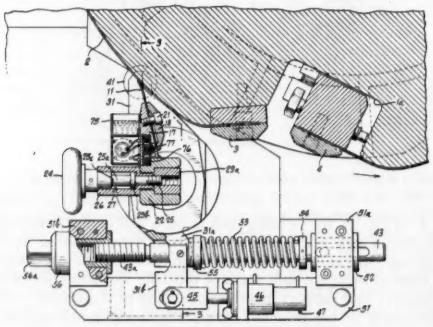


1. In a printing press including a printing cylinder having a peripheral printing surface, inking means including an inking form roller in contact with said printing surface for transferring ink thereto, dampening fluid means including a dampening fluid form roller in contact with said printing surface for transferring dampening fluid thereto, and transfer means positioned between said inking form roller and said dampening fluid form roller and having a contacting peripheral surface in contact with said form rollers for transferring ink and dampening fluid therebetween; the improvement comprising wherein said transfer means comprises a substantially flat metal helical band having a plurality of spaced windings arranged to form a generally cylindrical shaped roller, and means coupled to said helical band for expanding and contracting said helical band for, respectively, increasing and decreasing the spacing between the windings thereof to vary the area of contact between said transfer means and said form rollers for controlling the amount of fluid transfer between said form rollers.

3,877,369
INTAGLIO PRESS WITH SCRAPER BLADE APPARATUS

Salvatore F. D'Amato, Floral Park, and Chauncy P. Foote, Jr., Katonah, both of N.Y., assignors to American Bank Note Company, New York, N.Y.

Filed June 15, 1973, Ser. No. 370,524
Int. Cl. B41f 31/02
U.S. Cl. 101—157 2 Claims



1. An intaglio press comprising:

a. a plate cylinder adapted to support a printing plate having a circumferential length less than the cylinder circumference;

b. an intaglio plate supported on said cylinder and having its ends extending into at least one recess in said cylinder;

c. clamp means in each said recess for holding at least one end of a plate;

d. a resilient elongated scraper blade;

e. blade supporting means gripping the blade along one longitudinal margin and movable between;

1. an active position in which the longitudinal edge of the blade opposite said margin resiliently engages the plate and faces in a direction opposite to the cylinder rotation; and

2. a range of retracted positions in which said longitudinal edge is spaced from the cylinder periphery;

f. means biasing the blade supporting means to said active position;

g. means for moving said blade supporting means against said biasing means to said range of retracted positions;

h. said moving means including:

1. cam means rotatable with the cylinder;

2. follower means cooperating with the cam means and connected to the moving means to move the blade supporting means within its range of retracted positions when the blade edge is adjacent a recess in the cylinder;

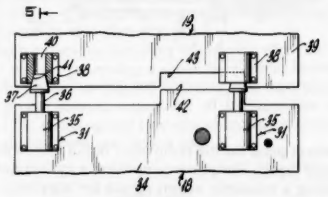
3. motor means for driving the blade supporting means to retract it against the force of said biasing means; and

4. a lost motion connection between the motor means and the blade supporting means, said motor means being movable between a retracting position in which the lost motion is taken up and the blade is retracted from the plate and an operating position in which the blade supporting means is free of the motor means as long as the blade supporting means is within the range of the lost motion connection, so that the biasing means holds the blade supporting means in its active position and flexes the blade as determined by the force of the biasing means, unless the blade is separated from the plate by engagement of the cam means with the follower means.

3,877,370
PRINTING PRESS

Walter G. Hantscho, Poundridge, N.Y., assignor to George Hantscho Company, Inc., Mount Vernon, N.Y.

Continuation of Ser. No. 270,523, July 10, 1972, abandoned.
This application Nov. 12, 1973, Ser. No. 414,713
Int. Cl. B41f 5/06
U.S. Cl. 101—216 5 Claims



1. A non-perfecting web offset press comprising a base including a pair of side frames and a driven pressure roller, a head including a pair of side frames releasably secured to said base and including plate and blanket rollers and ink and water motions, disengageable means mechanically coupling said pressure and blanket rollers, said pair of base side frames including head aligning means and said head having aligning means cooperating with the first said aligning means to maintain precise alignment of one pair of side frames with the other pair of side frames, jacks each having means movable in the direction of movement of the head carried by one pair of side frames, and jack engaging means carried by the other pair of side frames, the said movable means of said jacks being operable to engage said jack engaging means to elevate and lower said head relative to said base while retaining said head in

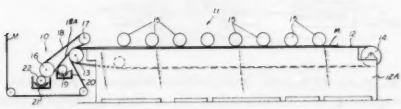
position to facilitate engagement of said precise aligning means on said head with said cooperating aligning means on said base, whereby said jacks function to facilitate engagement and disengagement of said cooperating alignment means in removal and replacement of said head on said base so that upon placement of a new head upon said base with the jacks in elevated position; lowering said jacks serve to lower the head to enable engagement of said head and base alignment means to precisely hold said head in alignment with said base.

3,877,371

SCREEN PRINTING LINT REMOVING APPARATUS AND METHOD

David Jaffa, Fairlawn, N.J., assignor to Precision Screen Machines Inc., Hawthorne, N.J.

Filed Sept. 28, 1972, Ser. No. 292,859
Int. Cl. B41f *35/00*
U.S. Cl. 101—425 **9 Claims**



6. A method of removing lint from a sheet of material to be screen printed comprising the steps of:

disposing an endless member in engagement with the surface of a sheet of material to be printed,

coating the surface of the endless member with a layer of material capable of attracting lint thereto,

moving the coated surface of the endless member relative to the material to be printed and in contact therewith so that any lint attracted thereto is removed from said material,

and effecting the removal of the lint and coating from said endless member as said endless member is moving relative to said material after contact with said material.

3,877,372

TREATMENT OF A PRINTING PLATE WITH A DAMPENING LIQUID

Kenneth W. Leeds, 2719 Elm Dr., North Bellmore, N.Y. 11710

Filed Dec. 3, 1973, Ser. No. 421,442
Int. Cl. C09k *3/18, 3/00;* **B41m** *3/08*
U.S. Cl. 101—465 **4 Claims**

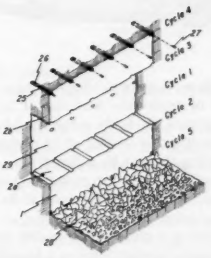
1. In the treatment of a printing plate in lithographic offset or planographic printing to maintain an ink receptive printing area and a hydrophilic nonprinting area on the plate in which treatment a film of an aqueous dampening liquid is applied to the surface of the plate, the liquid comprising a desensitizing gum, water and at least one member of the group consisting of phosphoric acid, acid phosphate salts, gallic acid and tannic acid and being retained by the hydrophilic nonprinting area but repelled by the ink receptive printing area, thus separating and isolating the non-printing area from the ink which is applied to the printing area, the improvement in which the dampening liquid contains an additive system comprising ethylene glycol monobutyl ether, at least one of hexylene glycol and ethylene glycol, a silicone-glycol copolymer and a silicone emulsion defoamer, the proportion of the additive system in the dampening liquid being sufficient to produce a thin, more uniform film of water and better wetting over the entire plate surface thereby permitting printing with less water on the plate and to prevent stripping and emulsification of ink and to effect sharper printing with brighter colors.

3,877,373

DRILL-AND-BLAST PROCESS

Oswald R. Bergmann, Cherry Hill Township, N.J., and David L. Coursen, Newark, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 878,005, Nov. 19, 1969, abandoned. This application Dec. 7, 1973, Ser. No. 422,656
Int. Cl. F42d *3/04*
U.S. Cl. 102—23 **9 Claims**



1. A process for advancing an underground rock face which comprises performing a plurality of substantially continuous drill-load-blast sequences substantially concurrently as a group at different locations in the rock, followed by other such groups of sequences in a manner such as to produce a substantially continuous succession of groups of sequences, the number of said sequences carried out substantially concurrently as a group being less than about 35% of the total number of sequences in said succession, each substantially concurrent group of sequences producing a portion of a new face and said succession of groups producing an entire new face, each of said sequences comprising the steps of (a) drilling a hole in the rock from the face to be advanced, (b) placing a charge of condensed, exclusively secondary explosive in the hole, and (c) initiating the explosive charge in the hole by causing energy to be released into the charge by the impact of a projectile with the charge, by the impingement of a focussed laser beam onto the charge, or by the discharge of a spark from an electrode to the charge, said energy being projected to the charge from a location which is separated from the hole by a distance of less than about 30 feet and being released into the charge at a rate sufficiently high to cause detonation thereof, and a separate pulse of energy being released for the initiation of each charge.

3,877,374

PROTECTIVE COATING FOR CASELESS AMMUNITION

Ralph L. Cook, Tallahassee, Fla., assignor to Olin Corporation, New Haven, Conn.

Filed July 12, 1973, Ser. No. 378,736
Int. Cl. F42b *5/02*
U.S. Cl. 102—38 **6 Claims**

1. In a round of caseless ammunition comprising a projectile and a compacted charge of propellant, the improvement comprising a protective coating comprising at least one layer of microencapsulated vaporizable low heat transfer liquid adhered to the outer surface of the propellant charge.

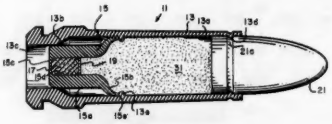
3,877,375
PRIMER

Irwin R. Barr, Lutherville, Md., assignor to AAI Corporation, Cockeysville, Md.

Continuation of Ser. No. 193,920, Oct. 29, 1971, abandoned, which is a continuation-in-part of Ser. No. 849,694, Aug. 13, 1969, abandoned. This application Aug. 27, 1973, Ser. No. 389,402

Int. Cl. F42c *19/10*

U.S. Cl. 102—45 **10 Claims**



1. An anvil-less percussive primer having a cup-shaped body portion formed of malleable material of a character and a thickness to maintain its body integrity when the primer is fired, yet sufficiently thin-walled at its closed base to enable percussive dimpling thereof by a firing pin,

said cup-shaped body portion containing a compact primer mixture and being effectively open at its forward end and devoid of an anvil,

said primer having a closed deformable rear end, and said compact primer mixture having a length greater than its cross-sectional width and being retained as a unit mass within said cup-shaped body in direct engagement with said closed deformable rear end,

said compact percussive primer mixture being ignitible as a function of abrupt external inwardly directed non-rupturing, central, percussive dimpling deformation of said closed deformable rear end,

said malleable material of said body portion being effectively non-combustible by and upon percussive firing of said primer mixture through said abrupt external inwardly directed deformation of said closed deformable rear end.

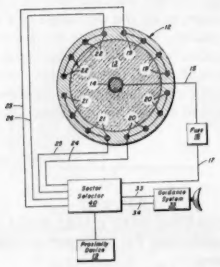
3,877,376
DIRECTED WARHEAD

Vahey S. Kupelian, Chevy Chase, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 27, 1960, Ser. No. 45,766

Int. Cl. F42b *13/48*

U.S. Cl. 102—67 **6 Claims**



1. A directed warhead comprising in combination a missile, an explosive charge carried by said missile, a casing for said charge, associated means for weakening determinable sectors of said casing, signal generating target detection and direction determining means carried by said missile, means carried by said missile responsive to signals from said target detection and direction determining means for actuating at least one of said sector weakening means, and means for detonating said explosive charge in timed relationship with the actuation of said sector weakening means whereby a signal from said target detection and direction determining means will actuate said sector weakening means in timed relationship to the detonation of said explosive charge creating a maximized explosive effect in the direction of said weakened sector and a target.

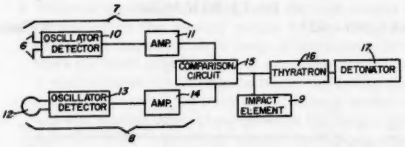
3,877,377
PROXIMITY FUZE

Jacob Rabinow, Takoma Park, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 17, 1955, Ser. No. 482,438

Int. Cl. F42c *13/04*

U.S. Cl. 102—70.2 P **5 Claims**



1. In an ordnance ammunition missile, a proximity fuze comprising the combination of: a first proximity element having a first antenna means for directing radiation generally forwardly with respect to the direction of missile flight, a first oscillator-detector operating at a first frequency and connected to said first antenna means, said first oscillator-detector being so constructed and arranged that the reflected signal from a target received by said first antenna means combines with the signal being radiated thereby to produce a first doppler signal at the output of said first oscillator-detector, and a first amplifier connected to said first oscillator-detector for amplifying said first doppler signal; a second proximity element having a second antenna means for directing radiation generally laterally with respect to the direction of missile flight, a second oscillator-detector operating at a second frequency and connected to said second antenna means, said second oscillator-detector being so constructed and arranged that the reflected signal from a target received by said second antenna means combines with the signal being radiated thereby to produce a second doppler signal at the output of said second oscillator-detector, and a second amplifier connected to said second oscillator-detector for amplifying said second doppler signal; an amplitude comparison circuit connected to the outputs of said first and second amplifiers which produces a firing signal when said outputs attain a predetermined ratio; and a detonator connected to said amplitude comparison circuit so that if a target is in a relation to the radiation fields of the first and second antenna means such that it reflects signals which produce said determined ratio, said firing signal will fire said detonator.

3,877,378
SAFETY AND ARMING MECHANISM

Fitzhugh T. Clark, Chicago, Ill., and David T. Theodore, Washington, D.C., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

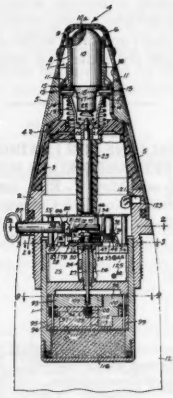
Filed Sept. 28, 1954, Ser. No. 458,999

Int. Cl. F42c *9/04*, *15/04*

U.S. Cl. 102—71 **9 Claims**

1. In a fuze for an explosive projectile having a base section, a body section, and a nose section, a safety and arming mechanism including a firing train having a booster charge and acceleration-sensitive means for initiating fuze arming when the projectile to which the fuze is affixed is fired from a gun, the improvement comprising: an impact assembly located in the nose portion of the fuze, said impact assembly comprising a cartridge containing a dust under pressure, means for releas-

ing said dust from said cartridge after the projectile to which the fuze is affixed is airborne, the action of the dust passing



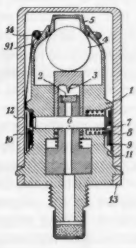
over the projectile serving to deposit an electrostatic charge upon the projectile.

3,877,379

MULTIPURPOSE PERCUSSION FUSE

Christian Losfeld, 13/15 rue Thiebault, Charenton, France (94220)

Filed Aug. 29, 1973, Ser. No. 392,674
Claims priority, application France, Sept. 1, 1972, 72.31038
Int. Cl. F42c 9/14
U.S. Cl. 102—74 **16 Claims**



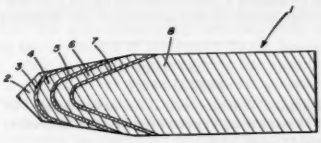
1. A percussion fuse comprising a primer, a striker, a massive member adapted to cause said striker to hit said primer when the impact shock takes place, said massive member being freeely movable in all directions, a pin locking said primer and striker in their relative storage position, a mechanism constantly tending to eject said pin, and a safety device counteracting the ejection of said pin, said fuse being characterized in that said safety device comprises three separate parts, namely a cap, covering and protecting said fuse, a detachable ring, and finally a weighted tape wound around the fuse for counteracting the ejection of said pin, said detachable ring surrounding said weighted tape and preventing the unwinding thereof.

3,877,380

LAYERED PROJECTILE FOR CLOSE-IN WEAPON SYSTEM

Carlo Riparbelli, Pomona, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 21, 1972, Ser. No. 277,212
Int. Cl. F42b 11/14
U.S. Cl. 102—92.4 **5 Claims**



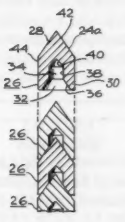
1. A projectile comprising:
a solid main body having a cylindrical section and a tapered nose section;
at least one conically shaped layer of another material affixed to and conforming to the shape of said tapered nose section, said other material being soft in comparison to the material from which said main body is fabricated; and
at least one conically shaped layer, formed from the same material from which said main body is fabricated, affixed to and conforming to the shape of said conically shaped soft layers,
said layers extending no farther back than the cylindrical portion of said main body and said layers and the layers and main body together having substantially a bullet shape,
said soft layer acting to prevent the spreading to the main body of cracks which develop in the outer layer upon target impact.

3,877,381

SHOTGUN PELLET ARRANGEMENT

James E. McCoy, 5183 Wood Ave., South Gate, Calif. 90280

Filed July 16, 1973, Ser. No. 379,842
Int. Cl. F42b 11/00, 7/04
U.S. Cl. 102—92.4 **5 Claims**



1. A charge for a shotgun shell comprising, in combination:
a plurality of stacks of nesting pellets, each of said stacks of nesting pellets comprising a plurality of pellets, and each of said plurality of pellets comprising:
a body member having:
a central portion having first walls defining a first predetermined external configuration;
a forward portion forward of said central portion and having second walls defining a second predetermined external configuration;
an aft portion spaced from said forward portion and aft of said central portion and having third walls defining an aperture extending therein, and said third walls defining a third predetermined configuration, said third

predetermined configuration of said aperture having a first frustro-conical section, a second cylindrical section, and a third conical section;

said second walls of each of said pellets insertable in said aperture in said aft portion of an adjacent pellet, and

said second predetermined external configuration being conical and having a first section in substantially co-extensive contact with said first frusto-conical section of said third walls of said adjacent pellet, and a second section extending a predetermined depth into said second cylindrical section of said aperture in said adjacent pellet.

3,877,382

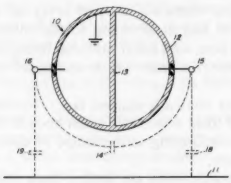
FIELD FUZE

Henry P. Kalmus, Washington, D.C., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 25, 1957, Ser. No. 667,997

Int. Cl. F42c *13/00*

U.S. Cl. 102—70.2 P **4 Claims**



1. A missile fusing system of the quasi-stationary field type, said system comprising in combination: an explosive missile having a case; two electrodes each extending through and insulated from the case of said missile and located at diametrically opposed positions around the periphery of said case; neutralizing means for reducing the free space transfer capacitance between said electrodes in order to make the increase in transfer capacitance between said electrodes, as said missile approaches a target, a readily detectable portion of the total transfer capacitance; said neutralizing means including external electrostatic shielding means consisting of the case of said missile and internal electrostatic shielding means consisting of an internal projection of said case; balancing means for balancing out the remainder of said free space transfer capacitance not eliminated by said neutralizing means; and means responsive to a predetermined increase in the transfer capacitance between said electrodes caused by target proximity to detonate said missile.

3,877,383

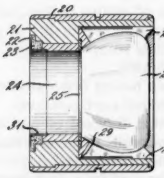
MUNITION

Abraham Flatau, 2003 Stockton Rd., Joppa, Md. 21085

Continuation-in-part of Ser. No. 105,751, Jan. 6, 1971, abandoned. This application July 17, 1972, Ser. No. 272,252

Int. Cl. F42b *13/12*

U.S. Cl. 102—93 **14 Claims**



1. A ring shaped airfoil munition projectile to be launched from a gun comprising: a means of producing high lift, low drag, and extended range, said means consisting of an annulus having essentially a continuous unbroken exterior airfoil cross section, said annulus having major annular outer and inner substantially curvilinear surfaces which form the diametrical extents of said projectile with at least one of said curvilinear surfaces so configured to provide aerodynamic lift for said projectile, and said annulus having leading and trailing edges joining said major outer and inner surfaces defining the longitudinal extent of said projectile; and means for rotating said projectile.

3,877,384

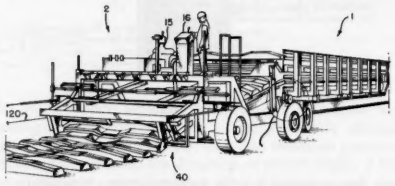
METHOD AND MACHINE FOR LAYING RAILROAD TIES ON A PREPARED ROAD SURFACE

Joseph G. Fearon, and Matt F. Rice, both of Boise, Idaho, assignors to Morrison-Knudsen Company, Boise, Idaho

Filed Dec. 21, 1972, Ser. No. 317,704

Int. Cl. E01b *29/10*

U.S. Cl. 104—6 **9 Claims**



1. A machine for aligning and dispensing railroad ties along a roadbed surface to an established reference line extending along the length of the roadbed surface, comprising:

a vehicle supporting railroad ties thereon adapted for travel along a roadbed surface along which a reference line extends,

sensing means for sensing the position of the vehicle relative to the established reference line,

a shifting carriage assembly having an infeed and an outfeed end for receiving and discharging ties, the shifting carriage assembly supported by the vehicle for movement transverse to the direction of travel of the vehicle from a receiving position wherein ties are received from the vehicle to an alignment position relative to the established reference line for discharge of ties aligned with respect to the reference line one at a time, the assembly including discharge means at its outfeed end for discharging an aligned tie at a predetermined spaced interval from a previously discharged tie onto the roadbed surface responsive to forward travel of the vehicle,

power means operatively connected to the shifting carriage assembly for transverse shifting thereof, and

first control means connected between the sensing means and power means for shifting the carriage assembly from the receiving position to the alignment position for discharge of ties one at a time responsive to the sensing means and the established reference line.

3,877,385

ROLLING STOCK ACCELERATOR

Kenichi Murato, Tokyo; Katsutoshi Sema, Omiya; Mitsuru Wakao, Iwatsuki; Yoshinori Kobayashi, Sagamihara, and Koichi Hara, Tokyo, all of Japan, assignors to Japanese National Railways and Kayabakogyokabushiki-kaisha, both of Tokyo, Japan

Filed Apr. 15, 1974, Ser. No. 461,137

Claims priority, application Japan, Apr. 17, 1973, 48-42727

Int. Cl. B61b *13/00*

U.S. Cl. 104—167 **3 Claims**

1. A Rolling Stock Accelerator comprising the following:

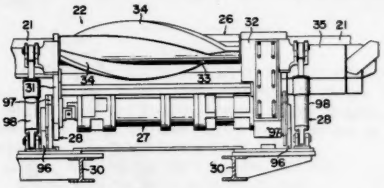
A. A number of hydraulic units disposed along the rails of a railway track or the like.

B. An hydraulic pressure source for supplying working fluid under pressure to these hydraulic units.

C. A command unit for controlling the operation of a number of hydraulic units, each of which includes the following:

a. A drive assembly comprising an hydraulic motor and a screw drum having helical fins mounted thereon to make driving contact with the flange of a car wheel, said screw drum being driven by the hydraulic motor.

b. A control valve assembly including an initial operation valve adapted to give the start signal to the hydraulic motor in response to a command signal from the command unit, and a rotary drum coupled to the screw drum so as to interrupt the flow of working fluid under pressure to the hydraulic motor, thereby controlling the angle of rotation of said screw drum.



c. A support assembly including a number of hydraulic cylinders interposed between the base and the drive assembly and command unit so as to selectively shift them from their inoperative positions to their operative positions or vice versa.

3,877,386

APPARATUS FOR CONTROLLING CONVEYANCE OF ARTICLES

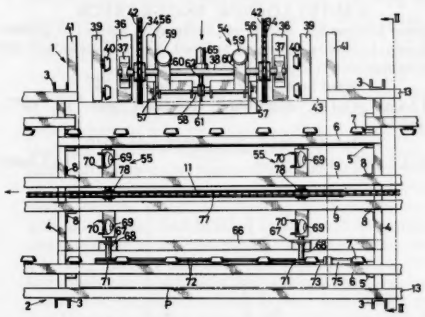
Takao Wakabayashi, Osaka, Japan, assignor to Nakanishi Metal Co., Ltd., Osaka, Japan

Filed Nov. 2, 1973, Ser. No. 412,130

Claims priority, application Japan, Nov. 4, 1972, 47-110553

Int. Cl. B61b *13/00*

U.S. Cl. 104—172 R **10 Claims**



1. In a conveyor system having a first conveyor for conveying articles and a second conveyor disposed at one end of the first conveyor transversely thereof for receiving the articles from the first conveyor, an apparatus for controlling conveyance of articles comprising the second conveyor including a number of rotatable supporting members arranged in two rows longitudinally thereof for supporting the articles, a drive chain interposed between the two rows of supporting members in parallel thereto and positioned below the supporting members, a number of normally raised pushers tiltably pivoted, each at an intermediate portion of its length, to the drive chain at specified spacing and each having an upper projection and a lower projection, the upper projection being engageable with an article on the supporting members when in its raised position and disengageable from the article when tilted and means for tilting the pusher engaging an advancing article when the article approaches a preceding article stopped during transport; an upwardly and downwardly movable cam disposed forwardly of the first conveyor in opposing relation to the front end thereof and positioned under the drive chain of the second conveyor, the cam having a horizontal upper surface of a length approximately equal to the width of the first conveyor and downwardly slanting surfaces at its front and rear ends respectively, the cam being operable to push up the lower end of the pusher by the horizontal upper surface when moving upward to bring the upper end thereof down to a level lower than the supporting members and to bring the horizontal upper surface out of contact with the lower end of the pusher when moving downward; and means for transferring the conveyed articles from the first conveyor onto the second conveyor.

3,877,387

TRACTION CAR

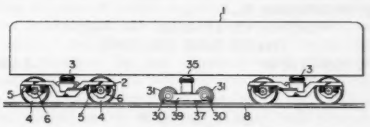
Syoji Kasai, and Yoshimitsu Onoda, both of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 7, 1972, Ser. No. 304,411

Claims priority, application Japan, Nov. 12, 1971, 46-89836

Int. Cl. B61b *13/12;* **B61c** *3/00, 11/00*

U.S. Cl. 105—49 **4 Claims**



1. An electric car of a type comprising a car body, at least one truck provided with at least one first axle and wheel combination for supporting said car body, and adhesion drive means for driving the car through said at least one first axle and wheel combination from electric motors mounted on said truck, and an electromagnetic means for providing at least one of driving and braking forces to the car by electro-magnetic forces generated in said electromagnetic means, characterized in that said electromagnetic means is mounted with at least one further axle and wheel combination mounted on a second truck, said second truck being provided space and separated from said at least one truck having said at least one first axle and wheel combination of said adhesion drive means, said electromagnetic means being independent of said adhesion drive means.

3,877,388

RESILIENT RAILWAY MOTOR MOUNTING

Walter O. Hall, Pittsburgh, and Charles A. Yuhas, Irwin, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 11, 1973, Ser. No. 396,268

Int. Cl. B61c *3/00, 9/50, 17/00*

U.S. Cl. 105—139 **7 Claims**

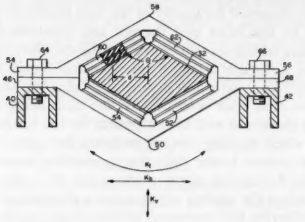
1. In a vehicle truck having a frame mounted on a plurality of axles with one or more wheels attached to each of said axles, the combination comprising:

a motor gearbox assembly having a gearbox portion coupled to one of said axles;

a polygonally shaped pin forming an integral part of one of said motor gearbox assembly and said frame and having predetermined dimensions and predetermined angles between adjacent sides of said pin; and

mounting means forming an integral part of the other of said motor gearbox assembly and said frame, and having, in cross section, a polygonal aperture therein which is complementary in shape with respect to said pin; and

elastomeric pad devices seated in the periphery of said aperture such that said pin may be received in and resiliently housed in said aperture, said pad devices having predetermined shear and compression spring constants



such that they cooperate with said predetermined angles and dimensions of said pin to simultaneously provide desirable spring rates in the horizontal, vertical and rotational axes.

3,877,389

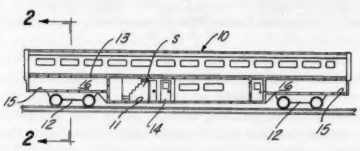
STABILIZING ROLL CONTROL FOR PNEUMATIC SPRING RAILWAY CAR

Albert G. Dean, Narberth, Pa., assignor to The Budd Company, Philadelphia, Pa.

Filed Feb. 19, 1974, Ser. No. 443,537

Int. Cl. B61f *1/14, 5/08*

U.S. Cl. 105—158 R **3 Claims**



1. Lateral roll control means for railway cars mounted on trucks, comprising in combination, truck bolster means, car body bolster means disposed above said truck bolster means for carrying a car body frame, resilient support means for the car body frame between the body bolster means and said truck bolster means, and resilient lateral restraint means between the body bolster means of said car body frame and truck bolster means located above the said car body bolster means, said lateral restraint means including air spring means, a connecting rod and supplemental resilient spring support means connected in series with each other between said truck bolster means and said car body bolster means to control the lateral roll movement of said car body frame on said truck bolster means.

3,877,390

CONVERTIBLE RAIL-HIGHWAY VEHICLE APPARATUS

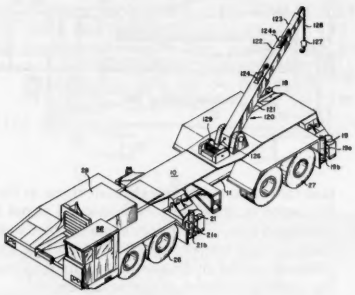
David B. Wallace, Birmingham, Ala., assignor to Steel City Crane Rentals, Inc., Birmingham, Ala.

Filed Nov. 20, 1973, Ser. No. 417,582

Int. Cl. B61c *7/00;* **B61d** *15/02;* **B62d** *61/12*

U.S. Cl. 105—159 **23 Claims**

1. Convertible vehicle apparatus comprising, highway-railway vehicle and appurtenant means including, first and second railway trucks each comprising rail-guided wheels, and propulsion means for propelling said truck either forward and backward on a railway, a highway vehicle for traveling on a highway and said highway vehicle being adapted to rest upon said first and second railway trucks with the latter being in tandem on a railway and be carried by said trucks on drive of said propulsion means thereof, and drive selector and start-stop control means including, drive selector means for controlling said propulsion means of each of said first and second railway trucks to propel said truck either forward and backward on a railway and for controlling said propulsion means of both of said trucks to propel said trucks either forward and backward on a railway, and start-stop control means communicating with said first and second railway trucks on a railway for controlling said propulsion means of either of said trucks to start propelling said truck when said propulsion means of said truck is to propel said truck either forward and backward on a railway as controlled by said drive selector means and to



cease propelling said truck when said truck on a railway is underneath or away from underneath said highway vehicle, and for controlling said propulsion means of both of said trucks from said highway vehicle for propulsion of said trucks carrying said highway vehicle on a railway on drive of said propulsion means of said trucks to be started either forward and backward as controlled by said drive selector means and for propulsion of said trucks carrying said highway vehicle on a railway on drive of said propulsion means of said trucks either forward and backward as controlled by said drive selector means to cease.

3,877,391

GANTRY LOADING BRIDGE TRUCK

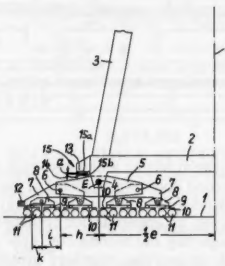
Werner Gimperlein, and Franz Sedlmayer, both of Wilhelmshaven, Germany, assignors to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed Sept. 7, 1973, Ser. No. 395,247

Claims priority, application Germany, Sept. 14, 1972, 2245031

Int. Cl. B61d *15/02;* **B61f** *1/08, 3/10*

U.S. Cl. 105—163 R **15 Claims**



1. An implement, especially gantry and loading bridge, which includes: a rail carriage system comprising a plurality of rocker means, frame means including a supporting base having a plurality of supporting sections pivotally connected to the respective rocker means, and abutment means arranged in

pairs on said frame means and the respective adjacent rocker means respectively and offset relative to said pivotal connections in the travelling direction of said carriage system so as to at least limit the angle of tilting of said frame means in said pivotal connections, the abutment means on said frame means being spaced from the pertaining abutment means on said rocker means by a distance permitting said rocker means to carry out oscillations relative to said frame means to compensate for unevenness caused by the rail route over which the implement is to be driven but limiting the angle of tilting of the implement for preventing jeopardizing the stability of the implement.

3,877,392

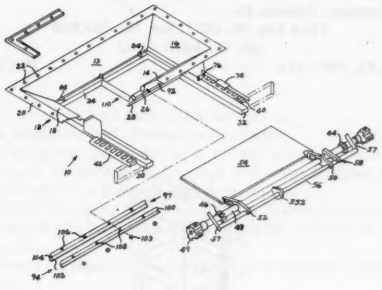
AUTOMATIC GATE LOCKING MECHANISM

Roger L. Akester, Saint Charles; Richard H. Dugge, Saint Louis; Wallace Lee Fossett, Weldon Spring Heights, and Jerry D. Waddell, O'Fallon, all of Mo., assignors to ACF Industries, Incorporated, New York, N.Y.

Filed Dec. 28, 1973, Ser. No. 429,466

Int. Cl. B61d *7/20, 7/22, 7/26*

U.S. Cl. 105—282 P **14 Claims**



1. A gravity outlet comprising:

inclined downwardly extending pans defining a discharge opening; said outlet having longitudinally extending supports on opposite sides of said opening each having a longitudinally extending rack mounted thereon; a gravity gate longitudinally movable between a closed position closing said opening and an open position leaving said opening free for the discharge of lading; at least one door bearing affixed to said gate having journaled therein a pinion shaft; at least two pinions affixed to said pinion shaft and adapted to engage said racks; means for rotating said shaft to move said pinions along said racks and move said gate between open and closed positions; a locking shaft journaled in said door bearing and movable therewith, said locking shaft having a locking shaft longitudinal axis transverse to the direction of movement of said gate; a locking member affixed to said locking shaft; at least one tripping lug and at least one keeper affixed to at least one of said longitudinal supports; said tripping lug and said keeper extending transversealy with respect to the movement of said gate; means for rotating said locking shaft to move said locking member between a locked position and a pre-tripped position engaging said tripping lug; said tripping lug tripping said locking member from said pre-tripped position to a tripped position as said gate is moved outwardly from closed toward open position; said keeper having a contour which cooperates with a contour on said locking member whereby engagement of said keeper by said locking member causes said locking member to pivot about said locking shaft longitudinal axis until, as said gate moves into the closed position, said locking member automatically assumes the locked position, held in place by said keeper.

3,877,393

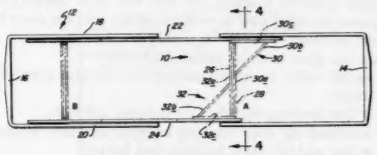
PNEUMATIC LADING DIVIDER

Russell M. Loomis, Palos Heights; Leroy W. Bertram, Wheaton; Gerald R. McLaughlin, and Michael D. Gaikowski, both of Chicago, all of Ill., assignors to Unarco Industries, Inc., Chicago, Ill.

Filed Jan. 28, 1974, Ser. No. 437,310

Int. Cl. B61d *45/00*

U.S. Cl. 105—492 **10 Claims**



1. In a pneumatic system of the type for protecting lading during transit including an overhead track system adapted for securement in a lading-carrying vehicle having longitudinal sidewalls, a pair of spaced lading-engaging panels each suspended from said track system, and pneumatic means disposed between said pair of panels for selectively forcing said panels apart and against lading within the vehicle; the improvement comprising in combination: expansible tie means holding the pair of panels together in a manner permitting relative movement therebetween to accommodate relative expansion of the pneumatic means but preventing independent separation of the pair of panels within the vehicle; a plurality of storage latch means secured to opposite longitudinal sidewalls of the vehicle; a plurality of outwardly biased latches carried on one of the pair of panels and positioned to latchingly cooperate with the storage latch means on the sidewalls of the vehicle; the storage latch means for each latch including an elongated apertured plate extending longitudinally of the car with latch-engaging inclined ramps at the ends thereof, arranged for cooperation with the outwardly biased latches to effect automatic latching engagement between latches and storage latch means; and a latch release operator carried on said one of the pair of panels for simultaneously releasing all latches from the storage latch means.

3,877,394

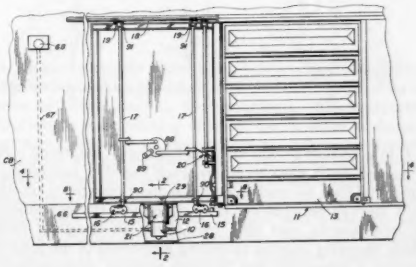
PNEUMATICALLY CONTROLLED RAILROAD BOX CAR DOOR LATCHING DEVICE

Paul R. Schmeling, 5540 Webster St., Downers Grove, Ill. 60515

Filed May 9, 1974, Ser. No. 468,401

Int. Cl. E05b *65/20*

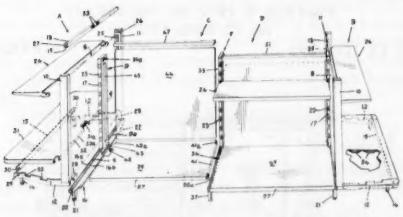
U.S. Cl. 105—395 **10 Claims**



1. A railroad box car door latching device comprising, in combination:

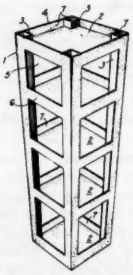
a. a railroad car including
1. a supporting frame;
2. a box car body mounted on the said supporting frame and having therein
a. a car door opening; and including
b. a car door movably mounted on the said box car body for closing the said car door opening and movable into and out of closed and open position;
b. an air brake system for supplying air under pressure to the brakes of the said railroad car;
c. car door latching means for latching the said car door in closed position to close the said car door opening and against unauthorized movement of the said car door into open position;
d. said car door latching means including
1. an air valve housing mounted on the said supporting frame;
2. a first latching member on the said car door;
3. a second car door latching member movably mounted in the said air valve housing and having
a. a latching portion adapted to latchingly engage the said first latching member on the said car door to prevent unauthorized movement of the said car door from closed into open position;
4. operating means in the said air valve housing for moving the said second car door latching member and the said latching portion thereof into latching engagement with the said first car door latching member to prevent unauthorized movement of the said car door from closed into open position; and
e. means for supplying air under pressure from the said air brake system of the said railroad car to the said air valve housing and to the said operating means therein to urge the said second car door latching member and the said latching portion thereof into latching engagement with the said first car door latching member to prevent unauthorized movement of the said car door from closed into open position.

3,877,395
BOLTLESS DISPLAY STAND
Sydney Murray Sobel, Toronto, Ontario, Canada, assignor to Anko Metal Products Limited, Weston, Ontario, Canada
Continuation-in-part of Ser. No. 308,321, Nov. 21, 1972, abandoned, which is a continuation of Ser. No. 158,847, July 1, 1971, abandoned. This application June 17, 1974, Ser. No. 479,841
Int. Cl. A47b *3/00*
U.S. Cl. 108—111 **2 Claims**



1. In a boltless display stand, a base unit comprising a pair of spaced apart base members, each member comprising a horizontal base bar and a vertical support post rising substantially midway between the ends of the bar and permanently secured thereto, said base bar having an upwardly facing flange receiving channel extending lengthwise of the top edge thereof; a removable first finishing member interconnecting the top ends of the vertical support posts of the pair of adjacent base members, a base shelf removably supported by and suspended between the base bars of the pair of base members, said base shelf having at each end thereof downturned flanges engageable in the upwardly facing channels and having longitudinally extending stiffening means on the underside thereof, an upright separable end frame, said end frame comprising a pair of end posts each post having an end base shelf support secured to and extending outwardly in one direction from the bottom end thereof and at right angles thereto and also having a hook member extending outwardly therefrom in the opposite direction, said hook member being engageable in one of said channels adjacent one end of one of said horizontal base bars, a stabilizing bar frictionally connectable to the free ends of the pair of end base shelf supports, an end base shelf supported by said pair of spaced apart end base supports, said end base shelf and end base shelf supports having interengaging complemental parts restraining relative movement between said end base shelf and the end base shelf supports and a second finishing member removably interconnectable to the top ends of the pair of end posts forming said end frame and to the adjacent vertical support post.

3,877,396
KNOCKDOWN DISPLAY RACK
John L. Patterson, Atlanta, Ga., assignor to The Coca-Cola Company, Atlanta, Ga.
Filed July 30, 1973, Ser. No. 383,861
Int. Cl. A47b *43/02*
U.S. Cl. 108—111 **29 Claims**

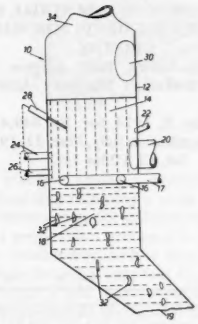


1. A knockdown rack assembly comprising:
a. a plurality of substantially-rigid shelf members adapted to be horizontally supported,
b. a plurality of vertical support members adapted to be horizontally spaced and disposed around the periphery of each such shelf member, each support member having a slotted portion for each such shelf member adapted to slidably receive and engage the periphery of such shelf members to horizontally support the same, each slotted portion of said support members being sized to engage the corresponding periphery of a shelf member such that, under loading of an upper shelf member, force is transmitted directly through the slotted portions of the support members and the engaged peripheries of the shelf members therebelow, and
c. a single sleeve-like member adapted to slidably engage said support members to enclose and restrain said support members in positions supporting said shelf members, said sleeve-like member having cut out areas corresponding to the openings framed by said support members and said shelf members.

3,877,397
INCINERATORS

Robert John Davies, Kent, and Dennis George Blows, Essex, both of England, assignors to Foster Wheeler John Brown Boilers Limited, London, England

Filed Dec. 7, 1972, Ser. No. 313,057
Claims priority, application United Kingdom, Dec. 10, 1971, 57590/71; Oct. 10, 1972, 46713/72
Int. Cl. F23g *5/00*
U.S. Cl. 110—8 R **14 Claims**



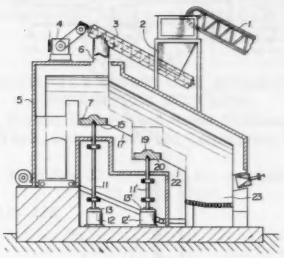
1. A waste disposal incinerator comprising
a. a fluidisable bed of refractory particles;
b. a waste inlet positioned so as to allow waste for incineration to be introduced into said bed when fluidised at a point within a fluidised region of said bed;
c. means for supplying fluidising gas to fluidise said bed and support combustion of any combustible material in said waste;
d. means for supplying fuel as required to maintain combustion;
e. a chamber in which hot refractory particles and any non-combustible material are collected for cooling before removal from the incinerator;
f. exit for removal of refractory particles and non-combustible material from the incinerator;
g. said chamber being at an angle such that when a batch of cool material is removed through the exit, said refractory particles and non-combustible material in the waste remaining in the chamber form a seal preventing substantial escape of fluidising air; and
h. means for charging refractory particles to said bed to replace those collected in said chamber.

3,877,398
INCINERATOR FEEDING SYSTEM

Minoru Ochi, Ageo, and Fumio Shibata, Tokyo, both of Japan, assignors to Ataka Construction Co., Ltd., Osaka, Japan

Filed Mar. 1, 1974, Ser. No. 447,344
Int. Cl. F23g *5/00;* **F23k** *3/00*
U.S. Cl. 110—8 R **3 Claims**

1. A feeding system for an incinerator having a housing enclosing a combustion chamber comprising:
means defining a generally horizontal platform within the housing, in communication with heat generated in the combustion chamber;
inclined trough means leading from the platform to the combustion chamber, the inclined trough means also being in communication with heat generated in the combustion chamber;
upstanding wall means about the platform to confine material transport to proceeding from the platform onto the inclined trough means;
conduit means extending through the housing over the platform, whereby material such as sludge forwarded into the housing through the conduit will fall onto the platform;
a multiple, radiating bladed agitator disposed upon the generally horizontal platform, these blades including ones having leading cutting edges for stirring and communicating said material falling onto said platform;
driving means under the pressure, operatively connected to the agitator, for rotating the agitator with the leading cutting edges presented angularly forwardly,

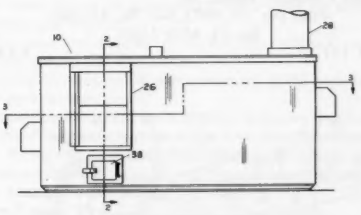


whereby material such as sludge, landing on the platform, is comminuted to expose more surface area thereof to heating and drying, and that as more material continues to land on the platform, the agitator propels the material it has comminuted into the inclined trough wherein the combined effect of gravity and of more comminuted material being propelled into the trough by the agitator, causes the comminuted material to slide down the inclined trough and into the combustion chamber.

3,877,399
ELECTRIC INCINERATOR

Nathaniel I. Gunn, Springfield, Mo., assignor to Federal Enterprises Inc., Nixa, Mo.

Filed Apr. 19, 1974, Ser. No. 462,340
Int. Cl. F23g *5/10*
U.S. Cl. 110—8 E **3 Claims**

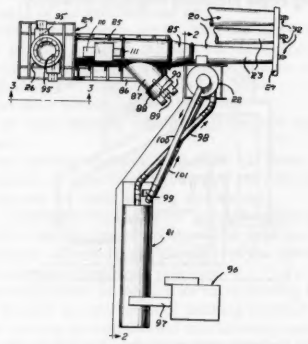


1. An incinerator for incinerating industrial and commercial wastes and providing maximum settling of particulates prior to release of waste gases to the atmosphere, said incinerator comprising a main burning chamber and a series of further chambers connected to one another to provide for further combustion and variation in velocity of the gases passing there through, a flame port opening into one of said chambers, said opening being provided with high temperature electric incinerator means in heat transfer relation with waste gas and particulate matter passing through the flame port opening, said flame port being constructed of refractory checkerwork to provide increased gas turbulence through checker-like openings and said electric incinerator means being in the form of spaced elongated heater elements extending across the checker-like openings.

3,877,400
INCINERATORS

Richard A. Dingwell, P.O. Box 711, Gray, Maine 04039

Division of Ser. No. 341,054, March 14, 1973. This application Aug. 12, 1974, Ser. No. 496,381
Int. Cl. F23g 5/12
U.S. Cl. 110—8 C 15 Claims

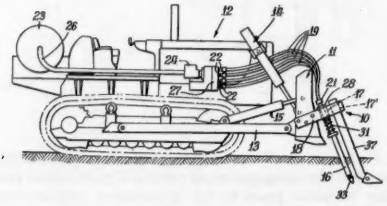


1. An incinerator plant comprising a combustion chamber including a forward portion and a rearward portion that is forwardly and outwardly tapered to the cross sectional size and shape of the forward portion, an oil burner in said rearward portion with its muzzle axially of said chamber and including a fuel supply, means including adjustable steam and air delivery means to atomize the fuel and to provide a spinning hot gas stream thereof axially of and through said chamber, a refuse collecting chamber with which the combustion chamber is in communication and which includes a stack, and a delivery port in said combustion chamber to receive materials to be incinerated.

3,877,401
SOIL INJECTION MEANS

Nathan Gutman, Loudonville, N.Y., assignor to Caterpillar Tractor Company, Peoria, Ill.

Filed Dec. 17, 1973, Ser. No. 424,960
Int. Cl. A01c 23/02
U.S. Cl. 111—7 9 Claims

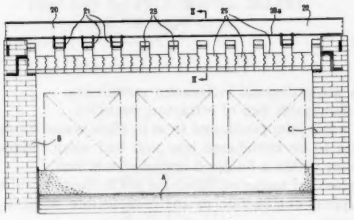


1. Injection means for injecting soil treating fluid beneath the surface of the soil, said injection means including a plurality of straight, elongated, hollow injector members, each having at a distal end thereof a fluid discharge port and being connected at the opposite end thereof to a soil treating fluid supply source, said injector members being slidably mounted with respect to the beam at fixed, lateral intervals on a horizontal beam by mounting means which restrain lateral movement of the injector members and which permit limited vertical movement of said members in response to the application of a predetermined force in an upwards direction to said members, said mounting means including separate spring means on each of said injector members for spring-biasing each of said injector members in a downward direction to restrain said members against upward vertical displacement with respect to said horizontal beam until sufficient force is applied to said members in an upward vertical direction to overcome the force of said spring means.

3,877,402
SUSPENDED CROWNS OF INDUSTRIAL FURNACES, AND REFRACTORY ELEMENTS FOR MAKING SUCH CROWNS

Ferdinando Palazzo, Venice, Italy, assignor to S.I.R.M.A. Societa Italiana Refrattari Marghera Azionaria, Venice, Italy

Filed Mar. 8, 1974, Ser. No. 449,424
Claims priority, application Italy, Mar. 22, 1973, 67821/73
Int. Cl. F23m 5/02
U.S. Cl. 110—99 R 6 Claims



1. A furnace crown suspended from parallel fixed beams, said crown comprising:

a. hook-shaped anchors adapted to engage the flanges of the beams and depend therefrom,

b. a plurality of anchored refractory bricks, of generally rectangular cross-sectional shape, spaced apart along the length of each beam, each anchored brick being formed at its upper end with means for accommodating said anchors and at its lower end with flanges projecting from two opposite sides of said anchored brick, the other opposite sides of said anchored brick each being formed with horizontally extending grooves and projections,

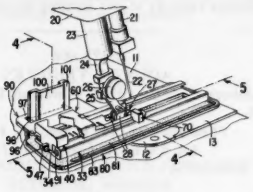
c. a plurality of non-anchored refractory bricks, of generally rectangular cross-sectional shape, each being devoid of means at its upper end for accommodating said anchors, each of said non-anchored bricks being formed at its lower end with flanges projecting from two opposite sides of said brick, the other two opposite sides of said non-anchored brick each being formed with horizontally extending grooves and projections, at least one of said non-anchored bricks being arranged between each two successive anchored bricks with the grooves and projections of the non-anchored brick intermeshed with the grooves and projections of bricks on each side of the non-anchored brick to thereby form parallel rows of bricks, and

d. a plurality of generally rectangular refractory plates each extending between two of said rows of bricks, the ends of each plate resting upon the projecting flanges of said bricks.

3,877,403
PRESSER DEVICES FOR SEWING BUTTONHOLES

Stanley J. Ketterer, Jamesburg, N.J., assignor to The Singer Company, New York, N.Y.

Filed Sept. 13, 1974, Ser. No. 505,871
Int. Cl. D05b *3/24*
U.S. Cl. 112—77 **5 Claims**

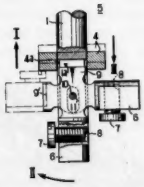


1. A sewing machine having a slotted work supporting throat plate, a feed dog including a work engaging bar surmounted with resilient material shiftable through said throat plate slot, and a presser foot arranged in opposition to said throat plate, in combination with a shoe member slidably supported relatively to said presser foot for translatory movement in the direction of said throat plate slot and including a bottom web portion arranged in opposition to the work engaging bar of said feed dog, a work engaging plate member having a thin substantially planar metallic portion arranged in operative position transposed between the web portion of said shoe member and the resilient work engaging bar of said feed dog, means for sustaining said work engaging plate member for translatory movement with said shoe member and in substantial congruity therebeneath, and means for interconnecting said shoe member with said work engaging plate member with capacity for movement of said work engaging plate member relatively toward and away from said shoe member.

3,877,404
PRESSER BAR UNIT FOR SEWING MACHINES

Toshiro Oda, 214 Joroku, Sakai-shi, Osaka, Japan

Filed Feb. 5, 1974, Ser. No. 440,089
Claims priority, application Japan, May 18, 1973, 48-05920
Int. Cl. D05b *29/12, 29/08*
U.S. Cl. 112—240 **2 Claims**

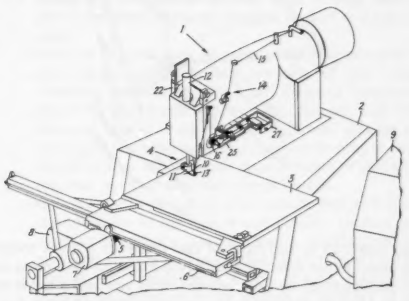


1. A presser bar unit for a sewing machine comprising a presser bar axially slotted at one end to form a forked end, a presser foot mounting body extending into said slot and pivotally supported by a pivot pin passing through the slotted end of the presser bar, said presser bar carrying two presser feet substantially normal to each other and extending outwardly from the mounting body in generally L-shaped configuration, such that either presser foot can be moved into operating position as the other is moved to a non-operating position through pivotal movement of said presser mounting body, said mounting body including two lugs projecting outwardly therefrom substantially oppositely from said two presser feet relative to said pivot pin such that each lug will lie in the axial slot of said presser bar when its opposite presser foot is in the operating position, and means for selectively locking said assembly with either presser foot in operating position, said locking means comprising a locking member slidably mounted on said presser bar for movement between two positions wherein, in one position, it embraces and locks the lug which is located in the slot, and, in its other position, is located clear of the lug in the slot so as to permit pivoted movement of said mounting body to selectively lock said mounting body in either of two pivoted positions in which respective ones of said presser feet are in operative position, said locking member including portions encompassing ends of said pivot pin, said portions being axially slotted so as to permit axial movement of the locking member relative to said pivot pin.

3,877,405
AUTOMATICALLY ADJUSTABLE APPARATUS FOR EMBROIDERY STITCHING

Adolph S. Dorosz, Beverly, and Reade Williams, Hamilton, both of Mass., assignors to USM Corporation, Flemington, N.J.

Filed Feb. 22, 1974, Ser. No. 444,869
Int. Cl. D05b *47/00*
U.S. Cl. 112—255 **8 Claims**



1. In an automatically controlled sewing machine having apparatus to intermittently form different types of stitches in a workpiece, means are provided to automatically adjust the sewing machine to accommodate the different characteristics of the stitching modes, said adjusting means comprising:

A. Control means for generating a signal when the stitching mode is to change;

B. A presser foot mounted on the sewing machine for movement toward the workpiece;

C. A stop element operatively connected to the presser foot to limit its movement;

D. Means connected to the stop element to vary the position thereof in response to the signal from the control means;

E. A variable tension device engaging the thread; and

F. Actuating means to adjust the tension device in response to the signal from the control means.

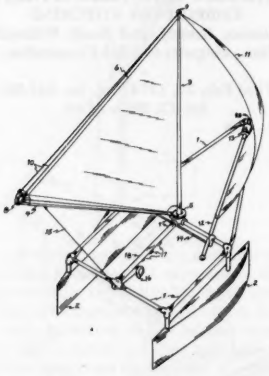
3,877,406
BODY SAIL

Manfred Davis, 5958 Delafield Ave., New York, N.Y. 10471

Filed July 31, 1972, Ser. No. 276,843
Int. Cl. B63h *9/04*
U.S. Cl. 114—39 **3 Claims**

1. A sailboat comprising a horizontal frame having three parallel rods of equal length running in a forward to aft direction, a first of said rods defining the port side and a second of said rods defining the starboard side of said sailboat, a third of said rods midway between said first and second rods defining a centerline of said sailboat, said three rods being fastened at their respective ends to front and rear cross rods running perpendicular to said three rods by fitting means, two additional rods extending forward from said port and starboard side rods beyond said front cross rod, one end of each said

additional rod being connected to said respective port and starboard side rods and the other end of each said additional rod meeting at a junction on said centerline of said sailboat, said junction defining the front of said frame and said rear cross rod defining the rear of said frame; a pair of low density floats fastened beneath said port and starboard side rods; a vertical mast fastened at one end to said frame at a junction of said third rod and said forward cross rod, said mast being formed with an eyelet at its other end; a tapered mainsail boom; a triangular mainsail; said mainsail being attached to said mast and said mainsail boom; the narrow end of said tapered mainsail boom being attached to said mast by a three degree of freedom swivel joint and a pulley being attached to the wide end of said tapered mainsail boom; a jibsail boom



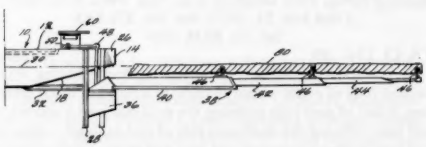
being attached to said front of said frame by a hinge means, said jibsail boom extending aft beyond said forward cross rod and encompassed by said forward cross rod and a guide rail attached below said forward cross rod; said jibsail boom being rotatable about its longitudinal axis; a triangular jibsail having one side attached to said jibsail boom and an apex of said triangular jibsail opposite said one side of said jibsail being attached to one end of a rope; said rope passing from said jibsail through said eyelet, around said pulley, and back to said eyelet where the opposite end of said rope is fastened; as said jibsail boom is rotated said jibsail is furled around said jibsail boom thereby pulling and moving said one end of said rope toward said jibsail boom, upon said movement said rope furling said mainsail around said mainsail boom and pivoting said mainsail boom upwardly toward said mast.

3,877,407

HYDRAULIC ICE BREAKER

Robert W. Worthing, Oklahoma City, Okla., assignor to North American Development Company, Chevy Chase, Md.

Filed Aug. 15, 1972, Ser. No. 280,801
Int. Cl. B63b *35/08*
U.S. Cl. 114—40 **6 Claims**



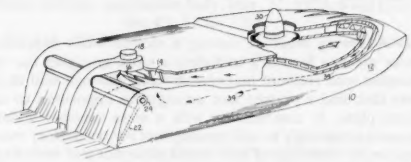
3. An ice breaker comprising:
a floating vessel having a deck;
a boom;
means mounting said boom to said vessel for vertical adjustment and horizontal swinging movement below water, said means including a carriage mounted outboard of the vessel for vertical movement from a position at deck level to a position below water level;
an upwardly facing jet nozzle carried in the outer end of said boom;
and means carried by said vessel for supplying said nozzle with liquid under high pressure for creating a liquid jet of sufficient velocity to cut floating ice from below.

3,877,408

AQUATIC VEHICLES

Wyly Kenneth Crowder, 3255 Windcroft Dr., Pontiac, Mich. 48054

Filed June 28, 1971, Ser. No. 157,341
Int. Cl. B63b *1/34;* **B60v** *1/02*
U.S. Cl. 114—67 A **5 Claims**



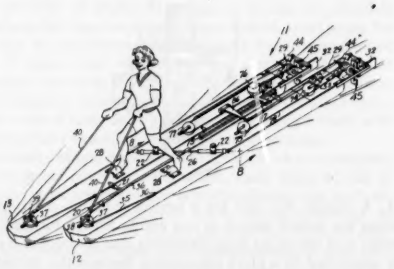
1. An air cushion aquatic vehicle comprising:
power means for driving said vehicle including air pressure means applying air flow at the bow and thru an air scoop longitudinally of said vehicle,
side and bow skirts on said vehicle for containing air beneath said vehicle,
water pump means for forming a flat wall of water at the stern of said vehicle and sealing said air beneath said vehicle, and
conduit means in said vehicle for directing water to said water pump means and separate from said air scoop,
whereby forward thrust and lift is provided to said vehicle.

3,877,409

WATER SKIS

Helge Krogseng, P.O. Box 583, Achorage, Alaska 99510

Filed July 13, 1973, Ser. No. 379,002
Int. Cl. B63h *16/08*
U.S. Cl. 115—25 **13 Claims**



5. A water ski assembly comprising:
a. a pair of elongated buoyant members;
b. foot receptacle means on each of said buoyant members for receiving the feet of an operator of the assembly;
c. means slidably interconnecting said members for relative longitudinal movement and constraining said members to substantial parallelism;
d. impeller means on each of said buoyant members;
e. means on each of said buoyant members linked to said impeller means on the other of said buoyant members for

driving said impeller means in response to normal walking movements by said operator; and

f. means constraining the buoyant members to movement in the same plane

g. said constraining means further comprises respective horizontal guide sleeves swivelly mounted on the buoyant member for horizontal rotation, and a rod member slidably engaged through said guide sleeves.

3,877,410

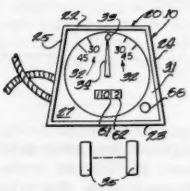
POSITION INDICATOR DEVICE FOR VEHICLE STEERING WHEELS

Henry B. Biven, 2265 Park Ave., Norwood, Ohio 45212

Filed Nov. 30, 1973, Ser. No. 420,615

Int. Cl. B60q *1/42*

U.S. Cl. 116—31 **1 Claim**



1. A position indicator device intended for installation in a dashboard of a conventional automotive vehicle to provide visual indication of the orientation of the steering wheels of the vehicle relative to the central axis of the vehicle as well as to provide a distance travelled indication thereon, the device comprising, in combination:

a housing having a vertical back surface, a horizontal top surface, a horizontal bottom surface, opposed side wall surfaces, and an open front wall surface;

a compartment defined interiorly of said surfaces and opening outwardly of said open front surface of said housing; a transparent member affixed to the front peripheral edges of said top, bottom and side wall surfaces of said housing to close said open front of said housing;

a dial member disposed inwardly of said transparent member inside said housing and visible through said transparent member;

calibration markings disposed about a portion of said dial member, said markings including a zero marker index line centrally of said dial member along the vertical axis thereof with angular degree markings disposed on each side of said zero marking, said calibration markings corresponding to angular movements of the steering wheel of the vehicle relative to the longitudinal central axis of said vehicle;

an indicating pointer disposed intermediate said dial member and said transparent member and having its base end rotatively affixed through a central aperture provided in said dial member with said pointer rotatable in a manner overlying the face of said dial member and parallel thereto with its pointing end adapted to traverse the calibration markings for designating specific calibration markings during operation thereof;

an elongated flexible drive cable having one end drivingly connected to said pivot mounted base of said indicating pointer to effect movement of said pointer, the flexible cable extending outwardly of the back surface of said housing and terminating in an opposite end adapted to be connected to a gear mechanism which, in turn, is drivingly connected to a steering post of said vehicle for driving said cable rotatively in proportion to the rotative movement of said steering post;

said gear mechanism interposed between said free opposite end of said flexible cable and said steering post comprising:

a hollow rectangularly shaped box-like housing mounted adjacent a circumferal portion of said steering post in a manner to enclose a portion of said steering post;

a chamber defined interiorly of said casing and opening directly into communication with said steering post;

said casing being fixedly mounted on said vehicle with said steering post being rotatable relative thereto;

an arcuate segment gear having an inner arcuate edge affixed circumferally about a circumferal portion of said steering post with said segment gear projecting radially upwardly therefrom into said casing chamber; a row of a plurality of gear forming teeth extending along the circumferal arcuate edge of said segment gear completely between opposite ends of said segment gear;

a circular toothed gear member rotatively mounted to said casing and projecting inwardly of said casing chamber and having gear teeth disposed completely about the peripheral edge surfaces thereof, said teeth being in operative engagement with said arcuate segment gear teeth to be driven rotatively thereby in opposite directions about its axis upon rotation of said steering post in either direction about its axis;

coupling means connecting said opposite free end of said flexible cable to the axis of said circular toothed gear member for driving rotation thereby to effect simultaneous rotation of said indicating pointer upon the rotation of said circular gear which, in turn, rotates in a manner proportional to the degree of rotation of said steering post;

the rotation of said steering post effecting simultaneous similar type rotation of said flexible cable to drive said indicating pointer in a pivotal manner relative to said dial member to indicate the orientation of said vehicle steering wheels relative to said central longitudinal axis of said vehicle;

a distance indicator disposed in said housing compartment said distance indicator comprising:

a horizontal slot disposed in said dial member below the point of rotation of said indicating pointer;

a rotatable odometer type read-out mechanism disposed rearwardly of said slot inwardly of said housing compartment and having the indicating wheel members thereof visible through said slot exteriorly of said transparent member;

a flexible cable having one end connected to said read-out mechanism for drivingly rotating the same in opposite directions in a manner to increase and decrease the reading thereon depending upon the direction of rotation of said flexible cable;

said flexible cable extending outwardly of said back surface of said housing and terminating in a free end adapted to be positively connected to a speedometer and odometer cable of said vehicle to be drivingly rotated therewith in a manner proportional to the distance travelled by said vehicle in both a forward and a backward direction of movement of said vehicle;

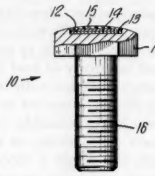
a reset button operatively connected to said read-out mechanism for manually resetting the reading of said read-out mechanism to zero when desired by the vehicle operator;

whereby said distance indicator indicates on said read-out device the distance travelled by the vehicle in feet in both a forward and reverse direction.

3,877,411
TEMPERATURE INDICATOR BOLTS

John A. MacDonald, Beaconsfield, Quebec, Canada, assignor to Railtech Ltd., Dorval, Quebec, Canada

Filed Jan. 2, 1974, Ser. No. 429,932
Claims priority, application United Kingdom, July 16, 1973, 33783/73
Int. Cl. G01k 1/02, 11/12
U.S. Cl. 116—114.5 5 Claims

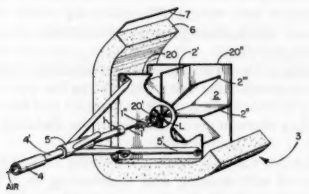


1. A temperature indicator bolt for use in an end cap of a roller bearing mounting on an axle, said bolt comprising a securable shank and an engageable head having an outer surface; a shallow depression in a substantial portion of the surface area of said outer surface; a wafer type indicator element retained in said shallow depression; said indicator element being provided with at least two sections, one of said sections being responsive to a predetermined overheating temperature and the other to another predetermined temperature lower than said overheating temperature; each said sections being impregnated, at least partly, with a chemical substance having indicating properties responsive to said predetermined temperature of said section whereby the color of said substance will change and remain changed when said bolt is subjected to said predetermined temperature, and a transparent protective covering over said wafer type indicator to removably secure said indicator element in said shallow depression.

3,877,412
METHOD OF AND APPARATUS FOR MASKING-NOISE GENERATION FOR ARCHITECTURAL SPACES AND THE LIKE

Clayton H. Allen, Wellesley, and Istvan L. Ver, Arlington, both of Mass., assignors to Bolt, Beranek & Newman, Inc., Cambridge, Mass.

Filed May 5, 1972, Ser. No. 250,823
Int. Cl. B06b 1/18, 1/20
U.S. Cl. 116—137 R 12 Claims

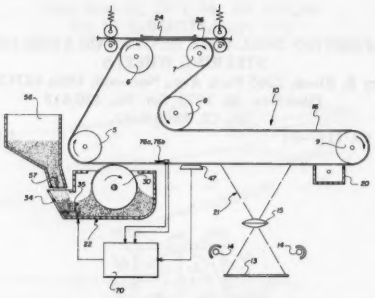


1. A masking-noise generator for architectural spaces and the like having, in combination, jet-producing means; means for supplying high velocity fluid to the jet-producing means to project a jet therefrom with a turbulent mixing region; solid surface means disposed substantially edge-on; and means for disposing the solid surface means in said region to produce by interaction with the said mixing region at least one of dipole and monopole noise radiation, the solid surface means comprising a matrix of rigid thin vanes radially extending from a common center line along the axis of the jet to generate a broadband, haystack spectrum with its peak at a predescribed frequency determined by the distance between the jet opening and the leading edge of the vanes of the matrix.

3,877,413
AUTO BIAS CONTROL APPARATUS

Stephen Royce Rowell, and David Charles Hogan, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed June 18, 1973, Ser. No. 370,997
Int. Cl. B05c 11/00
U.S. Cl. 118—7 5 Claims



1. In an electrographic apparatus having a development station with a development electrode from which electrostatically attractable toner particles are applied to a movable surface carrying an electrostatic charge pattern to form a toner image on the surface in accordance with such pattern, an improved auto bias control apparatus for applying a development bias signal to said development electrode comprising:
a. means disposed a predetermined distance spaced upstream from said development station for sensing the field strength of longitudinal increments of a charge pattern to provide analog signals representative thereof;
b. an analog to digital converter responsive to said analog signals to produce digital signals representative thereof;
c. means for sequentially storing said digital signals at particular storage locations respectively; and
d. bias signal applying means coupled to said storage means and responsive to the digital signals at particular storage locations which correspond to the longitudinal increment of the charge pattern entering the development station for applying development bias signals to said development electrode in increments corresponding to those previously sequentially stored in said storage meansn.

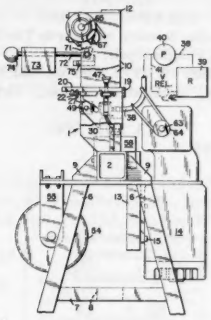
3,877,414
APPARATUS FOR COATING WIRE FILAMENT WITH LIQUID

Francis N. Brideau, Mound, and Floyd A. Dumas, Hamel, both of Minn., assignors to Acrometal Products, Inc., Minneapolis, Minn.

Filed June 4, 1973, Ser. No. 366,788
Int. Cl. B05c 1/06
U.S. Cl. 118—234 5 Claims

1. Apparatus for coating a moving wire with liquid comprising:
a. an elongated manifold having a plurality of spaced outlet openings arranged in a longitudinally extending row, and a liquid inlet opening spaced from said row of outlet openings;
b. a first body comprising a sheet of felt cloth partially encompassing said manifold and having an inner surface overlying said openings and a wire engaging outer surface;

c. means for releasably holding said sheet in engagement with said manifold;
d. a second body of soft elastic porous material having a wire-engaging outer surface;



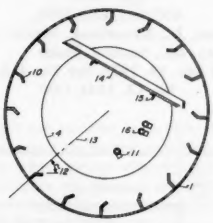
e. means mounting said second body in wire engaging face-to-face engagement with said first body whereby said second body absorbs coating liquid from said first body;
f. and means for guiding said wire between said bodies;
g. the elasticity of said bodies being such that each thereof yields to partially encompass said wire moving therebetween.

3,877,415

APPARATUS FOR APPLYING COATINGS TO SOLID PARTICLES

Glenn M. Blouin, Florence, Ala., assignor to Tennessee Valley Authority, Muscle, Shoals, Ala.

Continuation-in-part of Ser. No. 382,153, July 24, 1973. This application Feb. 1, 1974, Ser. No. 438,875
Int. Cl. B05b *13/02*
U.S. Cl. 118—303 **4 Claims**



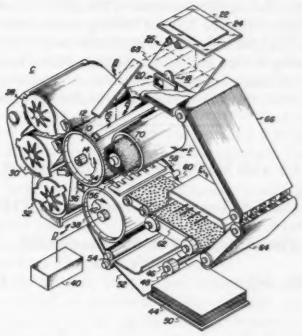
1. In an improved device of the class described including a rotary cylindrical drum having open ends and a length at least equal to its diameter disposed with its axis generally in about a horizontal attitude; a plurality of generally equally spaced lifting flights located on the inner peripheral surface of said drum and extending generally inwardly toward the axis thereof; two retaining rings singly disposed at the ends of said drum; liquid distributing means generally located in that lower quadrant, when viewed in a plane perpendicular to the axis of said drum, into which a point located at the bottommost position on said inner peripheral surface of said drum would next enter; said distributing means being substantially equal to the length of said drum between said retaining rings and generally disposed within said drum parallel to the axis thereof, and means for passing a current of gas through said drum; the improvement in combination therewith which comprises: deflector means rigidly supported by support means located outside the confines of said drum; said deflector means positioned within the confines of said drum and being of a length substantially equal to the length of said drum between said retaining rings and in a plane substantially parallel with the axis of said drum, said plane located horizontally above said axis; said deflector means along the width thereof being generally horizontally inclined upwardly into that first upper quadrant which is 180° removed from said lower quadrant, the width of said deflector means being predetermined to allow for rotation of said drum and lifting flights thereover, and said deflector means having a discharge aperture along the lower edge thereof parallel to the axis of said drum and generally located in that second upper quadrant 90° removed from said lower quadrant.

3,877,416

HUMIDITY CORRECTED TRANSFER APPARATUS

James M. Donohue, Rochester, and Donald H. Fisher, Marion, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 23, 1973, Ser. No. 353,833
Int. Cl. G03g *13/00*
U.S. Cl. 118—637 **12 Claims**

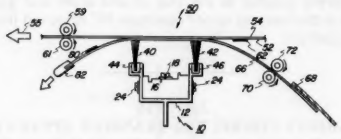


1. A humidity compensated apparatus for transferring charged particles from a support surface to a sheet of support material, including:
a transfer member having the sheet of support material secured thereto, said transfer member cooperating electrically with the support surface to attract the charged particles to the sheet of support material;
means for electrically biasing said transfer member to a potential of sufficient magnitude to attract the charged particles from the support surface to the sheet of support material;
means for correcting automatically said electrical biasing means to compensate for the resistivity of differing support materials and for resistivity changes produced in said transfer member by variations in the relative humidity of the surrounding environment; and
corona generating means disposed adjacent to the support surface and adapted to apply an alternating charge potential to the support surface pre-conditioning the charged particles thereon to readily facilitate the transfer thereof from the support surface to the support material by said transfer member.

3,877,417
TRANSFER CORONA GENERATING DEVICE WITH SUPPORT BRUSHES

Lothar S. Jeromin, Sierra Madre, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 15, 1973, Ser. No. 406,509
Int. Cl. G03g 13/16
U.S. Cl. 118—637 15 Claims

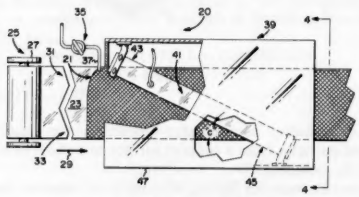


1. Apparatus for transferring a developed image formed on a support surface to a transfer member comprising:
- a support surface having a developed image formed thereon,
- a corona generating device located adjacent said support surface,
- means supported on said corona generating device for forcing a transfer member into contact with said support surface,
- means for introducing a transfer member between said support surface and said corona generating device whereby said transfer member is forced into contact with said support surface by said forcing means, and
- means for producing relative motion between said corona generating device and said support surface, energization of said corona generating device causing said developed image to be transferred to said transfer member.

3,877,418
APPARATUS AND METHOD FOR COATING METALLIC STRIPS

Kenneth H. Shaner, Towanda, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Aug. 22, 1974, Ser. No. 499,520
Int. Cl. B05c 5/02
U.S. Cl. 118—642 15 Claims

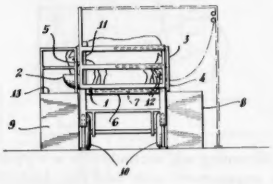


1. An apparatus for applying a relatively thin and substantially uniform coating of photosensitive material to at least one side of a substantially vertically oriented metallic strip and for substantially drying said photosensitive material thereon as said metallic strip moves in a substantially horizontal direction along a predetermined path, said apparatus comprising:
- means for supplying a substantially vertically oriented metallic strip to said apparatus in a substantially horizontal direction along a predetermined path, said strip having at least one side having an upper and a lower portion;
- coating means for applying a relatively thin coating of photosensitive material to said side of said metallic strip in a manner whereby said coating will flow substantially downward and cover said upper and lower portions; and
- drying means angularly positioned with regard to said horizontal direction of travel of said metallic strip for drying said coating in a substantially progressive manner whereby said coating on said upper portion of said side will be substantially dried before said coating on said lower portion.

3,877,419
MILKING STATION

Keith Rodger, Tumba, Sweden, assignor to The De Laval Separator Company, Poughkeepsie, N.Y.

Filed Oct. 10, 1973, Ser. No. 404,925
Claims priority, application France, Oct. 12, 1972, 72.36148
Int. Cl. A01j 5/00
U.S. Cl. 119—14.03 5 Claims

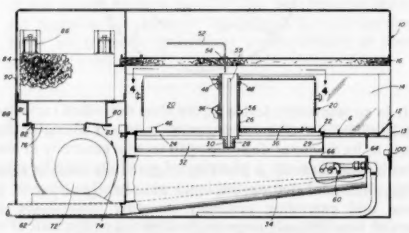


1. A milking station for animals which comprises a raised platform-stall having rail means for at least partly confining animals thereon and including a first part on which a plurality of animals can be positioned for milking, a manger located on one side of the platform-stall and from which the animals can feed in connection with milking, the station being characterized in that the raised platform-stall includes a second part forming a foot path along the side of the platform-stall farthest from the manger, one of said parts being movable relative to the other to reduce the depth of the platform-stall, as measured from the manger, from a depth including said path to a depth approximately equal to the length of the animals after they have taken up position in front of and at right angles to the manger.

3,877,420
ANIMAL HOUSING

John M. Eagleson, Jr., Kennebunk, Maine, assignor to The Baker Company, Inc., Sanford, Maine

Filed Nov. 15, 1973, Ser. No. 416,191
Int. Cl. A01k 1/00
U.S. Cl. 119—15 12 Claims



1. A controlled environment animal housing system, comprising:
- an enclosure having an air passageway in a wall thereof,
- housing means permeable to vertical air flow carried within said enclosure and set back from said air passageway,
- blower means mounted in said enclosure to suck air downwardly through said housing means, said bloweer means having a blown air output directed within said enclosure to a space above said housing means for producing a vertical downward air flow through and past said housing means.

exhaust means adapted to vent from said enclosure some of the blown air output of said blower means, and thereby establish an inward replenishing flow of air through said air passageway, said vertical downward air flow and said set back of said housing means cooperating to cause said inward replenishing flow of air to by-pass said housing means, and

filter means positioned in the blown air output path of said blower means to filter the air introduced into said housing means and vented from said enclosure.

3,877,421

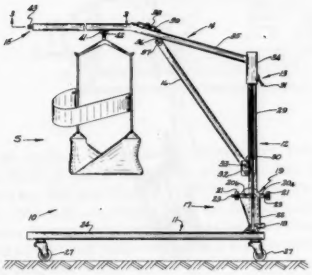
PATIENT LIFT AND EXERCISE APPARATUS

Cicero C. Brown, 5429 Sturbridge Dr., Houston, Tex.

Filed Sept. 7, 1973, Ser. No. 395,138

Int. Cl. A61h *1/02*

U.S. Cl. 128—25 R **7 Claims**



1. A movable lift and exercise apparatus comprising:

a. movable base assembly means, said base assembly being supported on wheel means whereby said base assembly may be rolled from one location to another;

b. support means carried by said base assembly, said support means including an elongate, substantially horizontal boom assembly connected to a substantially vertical mast assembly;

c. holding means carried by said boom assembly for holding a human body;

d. exercise means included in said apparatus and carried by said base assembly;

e. adjustment means for changing the relative position of said holding means and said exercise means whereby different human bodies may be carried in said holding means for use of said exercise means, said adjustment means including horizontal adjustment means for changing the location of said holding means relative to said base assembly and vertical adjustment means for changing the vertical position of said holding means; and

f. base width adjusting means included in said base assembly for changing the width of said base assembly whereby said base assembly may be made relatively wide for stability when said exercise means is being employed and may be made narrow when said assembly is to be moved or maneuvered in confined areas.

3,877,422

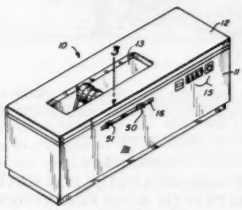
CONTROL TO LIMIT THE RECIPROCATION OF THE MASSAGING APPARATUS IN A THERAPEUTIC MANIPULATING MACHINE

Gordon D. Heuser, 2514 Stacy Ct., Colorado Springs, Colo. 80915, and Rolla J. Pennell, 10701 Winner Rd., Independence, Mo. 64052

Continuation-in-part of Ser. No. 418,362, Nov. 23, 1973. This application Apr. 1, 1974, Ser. No. 457,063

Int. Cl. A61h *15/00*

U.S. Cl. 128—57 **3 Claims**



1. A therapeutic manipulating machine for manipulating and massaging portions of a patient's body, of the type which includes a table with an elongated opening in the top wherein a patient may lie, a carriage below the table riding upon a guide means to reciprocate longitudinally back and forth thereunder through a reach correlated with the length of the table opening, and a manipulating and massaging means carried by the carriage to extend into the aforesaid elongated opening to contact the body of a patient lying upon the table and to shift back and forth in this opening through a reach corresponding to the movement of the carriage, the improvement comprising:

a. said table includes a cabinet having a wall at one side thereof and a slot is formed in said wall at the position of the table opening;

b. reciprocating means to reciprocably shift the carriage means back and forth;

c. manually settable limit means including a position indicating standard mounted on the carriage adjacent said slot, controlling the reciprocating means to limit the reciprocable movement of the carriage to any selected incremental portion of the aforesaid reach,

d. reversing switch means mounted upon said standard at said slot to reverse the movement of the carriage reciprocating means whenever said reversing switch means is contacted, and

e. manually shiftable limit stop means mounted upon the table at each side of said slot to contact said reversing switch means and to restrict the reciprocation movement of the carriage to the increment defined by the space between the opposing limit stop means.

3,877,423

ADJUSTABLE FOOT SUPPORT FOR A LEG CAST

Werner L. Tollefsbol, Delran, N.J., assignor to SmithKline Corporation, Philadelphia, Pa.

Filed Nov. 23, 1973, Ser. No. 418,569

Int. Cl. A61f *5/04*

U.S. Cl. 128—83.5 **10 Claims**

1. An adjustable foot support for a leg cast comprising:

a main foot plate having an upturned toe portion at its lower end,

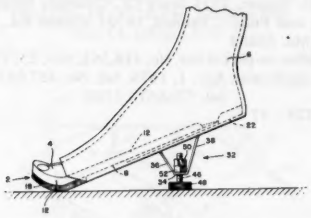
a heel plate,

first means adjustably connecting the lower end of the heel plate to the foot plate,

a heel support member,

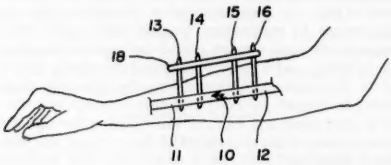
second means mounted on said heel support member ad-

justably connecting said heel support member to the main foot and heel plates to mount the heel support member



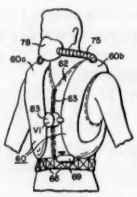
and secure the main foot and heel plates together at a point removed from the first mentioned means.

3,877,424
METHODS AND APPARATUS FOR EXTERNAL FIXATION OF BONE FRACTURES
William M. Murray, 105 Wynwood Rd., Pittsburgh, Pa. 15215
Filed Nov. 14, 1972, Ser. No. 306,214
Int. Cl. A61f *5/04*
U.S. Cl. 128—92 A **8 Claims**



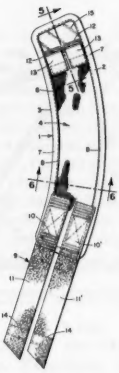
5. An apparatus for fixation of fractured bones comprising at least two elongated high strength threaded metal pins adapted to be inserted at one end into a fractured bone on opposite sides of the fracture, compliant bridge means adapted to engage said pins at the other end outside the patient's body and spaced from the bone, compression means acting on the pins generally parallel to the bridge and bone to urge the bone ends together within the compliant bridge means and means causing the compliant bridge to become rigid while said compression means acts on said pins.

3,877,425
UNDERWATER BREATHING APPARATUS
Wilbur J. O'Neill, Severna Park, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed June 12, 1969, Ser. No. 832,675
Int. Cl. A62b *7/00*
U.S. Cl. 128—142 **12 Claims**



1. Underwater breathing apparatus for a diver, comprising:
A. flexible breathing chamber means;
B. gas inlet means for supplying a breathable gas to said breathing chamber means;
C. exhaust valve means connected to said flexible breathing chamber means;
D. said flexible breathing chamber means being constructed and arranged, and said exhaust valve means being operably positioned so that there is always an inflated portion and a deflated portion of said flexible breathing chamber means for every diver orientation in the water; and
E. said inflated portion occupying approximately 40–60 percent of the total available breathing chamber means volume.

3,877,426
MUSCULAR SUPPORT
Robert P. Nirschl, 4143 N. River St., Arlington, Va. 22207
Filed Mar. 27, 1973, Ser. No. 345,370
Int. Cl. A61f *13/00*
U.S. Cl. 128—165 **6 Claims**



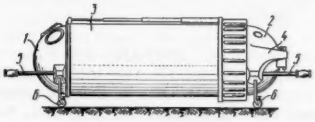
1. A support device capable of being wrapped about and surrounding the muscle of a bodily limb or member without extensive overlap and capable of applying circumferential pressure to a wide area of said muscle to thereby relieve internal tension on the muscle, comprising:
a substantially curvilinear, arcuately shaped pad having a length greater than its width and shaped to approximate the frustrum of a cone when wrapped about the muscle of said limb or member, said pad being flexible in all directions and comprising a laminate having an inner layer of resilient foamed material bonded to an outer layer of a substantially inelastic flexible sheet, and
a fastening means for securing said support device tightly about said muscle, comprising, in combination, at least one velcro fastener strip attached to the upper surface of said outer layer at one end of said pad and at the other end of said pad at least one ring attached to the upper surface of said outer layer, said velcro fastener strip having a loop section and a hook section, one of said sections of said velcro strip partially overlapping said pad and the other of said sections constituting a free end, whereby said pad can be fastened around the extremity by threading said free end of said strip through said ring and reversedly drawing said free end for attachment to said overlapping section.

3,877,427

OXYGEN COMPRESSIVE CHAMBER

Semen Mikhailovich Alexeev, Leningradsky prospekt, 56, kv. 65; Mark Nikolaevich Arkhangelsky, Gospitalny val, 3, korpus 6, kv, 70; Valentin Pavlovich Baldin, Raketny bulvar, 1, kv. 34; Boris Solomonovich Braverman, ulitsa Chertanovskaya, 31, korpus 2, kv. 22, all of Moscow; Jury Dmitrievich Vasiliev, ulitsa 2 Kommunisticheskaya, 8, kv. 88, Ljubertsy Moskovskoi oblasti; Vladimir Petrovich Gorjushev, ulitsa Birjulevskaya, 12, kv. 165, Moscow; Alexandr Lvovich Zelvinsky, ulitsa Novoslobodskaya, 49-2, kv. 117, Moscow; Jury Petrovich Rogachev, ulitsa Vereskovaya, 9a, kv. 6, Moscow; Gai Ilich Severin, ulitsa Lomonosova, 10, kv. 11, Zhudovsky; Jury Andreevich Spassky, p/o Kupavna, Schemilovskaya partia, 51, kv. 51, Moskovskaya oblast Noginsky raion; Boris Vasilievich Spolitak, stantsia Zagoryanskaya, ulitsa Matrosova, 2, Moskovskaya olbast Schelkovsky raion; Vladimir Vladimirovich Ushinin, poselok Tomilino, ulitsa Pionerskaya, 13, kv. 27, Moskovskaya oblast Ljuberetsky raion, and Rustam Ismailovich Utyamushev, ulitsa Tsiolkovskogo, 4, kv. 12, Moskovskaya oblast Schelkovo, all of U.S.S.R.

Filed May 25, 1972, Ser. No. 256,915
Int. Cl. A61m *16/02*
U.S. Cl. 128—204 **3 Claims**



1. An oxygen compressive chamber for rendering emergency medical aid to the patient placed inside said chamber, comprising first and second rigid end-face walls; a collapsible elastic side wall connected with the first of said end walls; a stretcher formed by a bed with tubular rods connected to the second of said end walls on one end; tubular sockets mounted in said first end wall and connected to the free ends of said rods of the bed so that when the said side wall is connected with said second end wall said side wall jointly with said end walls forms a closed volume wherein the bed is arranged; an airtightening connector releasably connecting said side wall to said second end wall; and means for supplying the chamber mounted on said first end wall with an oxygen supply means arranged in the leg portion, said system having circulation and purging injectors with outlets of each terminating within the corresponding one of said sockets in the first end wall, perforated manifold means disposed on said second end wall and communicating with said tubular stretcher rods, whereby said stretcher installed in said sockets conducts oxygen into the head portion of the chamber through said perforated manifold.

3,877,428

VARIABLE INFUSION CONTROL DEVICE

Charles E. Seagle, Salt Lake City; Gordon S. Reynolds, Bountiful; Karl A. Pannier, Jr., and James L. Sorenson, both of Salt Lake City, all of Utah, assignors to Sorenson Research Co., Inc., Salt Lake City, Utah

Filed Apr. 30, 1973, Ser. No. 355,841
Int. Cl. A61m *05/00*
U.S. Cl. 128—214 R **2 Claims**

1. A variable infusion device for administering liquids parenterally to a patient comprising:

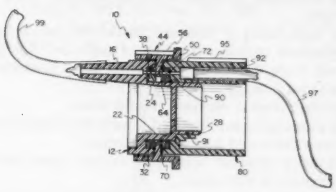
a fluid receiving means;

a fluid delivering means nonrotatably joined to the fluid receiving means; and

metering means interposed between the fluid receiving means and the fluid delivering means and comprising a single metering plate the periphery of which is exposed and hand rotatable about an axis, a capillary formed in at least one face of the metering plate, the capillary comprising:

at least two grooves of uniform cross-sectional area;

each groove being formed along an arc of constant radius, the arc traversing less than 360° about the axis; and



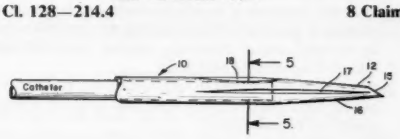
means providing fluid communication between the grooves; rotation of the metering plates altering the effective length of the capillary by a distance greater than the arcuate displacement of the metering plate.

3,877,429

CATHETER PLACEMENT DEVICE

David L. Rasumoff, 16901 Napa St., Apt. 219, Woodland Hills, Calif. 91343

Filed Nov. 30, 1973, Ser. No. 420,635
Int. Cl. A61m *05/14*
U.S. Cl. 128—214.4 **8 Claims**



1. A catheter placement device for introducing a catheter into a vein of a patient during a surgical cutdown procedure, comprising:

a hollow plastic member including a conical portion having a base and a truncated distal end, said conical portion also including a first set of longitudinally disposed slits extending from said base axially along said conical portion to a point substantially adjacent said distal end but spaced inwardly therefrom and adapted to split thereat when a catheter is moved through said hollow plastic member toward said distal end the unsplit portion of said distal end initially retaining rigidity enough to dilate a collapsed vein.

3,877,430

ARTIFICIAL INSEMINATION APPARATUS

Horst K. Wieder, 1207 Riverview Ln., Watertown, Wis. 53094

Filed July 17, 1974, Ser. No. 489,169
Int. Cl. A61m *37/02*; **A61d** *7/02*
U.S. Cl. 128—235 **7 Claims**

1. A straw assembly for the artificial insemination of animals, said straw assembly comprising the combination of:

a straw consisting of a tubular member of polymeric synthetic resinous material,

said polymeric synthetic resinous material being heat sealable,

said straw filled with semen-containing fluid,
said straw heat sealed at one end to provide a heat sealed closure,
said heat sealed closure being sealed to withstand internal liquid pressure applied thereto by the liquid within the straw of 50 pounds per square inch,
said polymeric synthetic resinous material being relatively rigid,
said walls being of sufficient thickness and said polymeric synthetic resinous material of sufficient rigidity so that said straw withstands an internal liquid pressure of 50 psi without leakage,
a piston member received in said straw,
said piston member disposed toward the opposite end of the straw from said heat sealed closure,
said piston member being substantially spherical when not received in said straw,
said piston member being of polymeric elastomeric material,
said piston member being relatively resilient with respect to the rigidity of said walls of said straw,
said piston member deformed as received in said straw into a substantially cylindrical member having convexedly extending ends,
said piston member disposed to exert at least 50 pounds per square inch pressure on the contents of said straw when urged inwardly into said straw with a pusher member, without leakage of said contents past said piston member.

5. The combination of the device of claim 1 with a sheath tube and pusher member wherein:
said sheath tube is a tubular member having its internal and external dimensions gradually reduced at one end to provide a terminal orifice at said end, said orifice having an internal lateral dimension smaller than the internal lateral dimension of said straw,
said sheath tube disposed to receive said straw after removal of said heat sealed closure from said straw to provide an open end of said straw,
said gradually reduced portion of said sheath tube adapted to receive said open end abutted thereagainst,
said pusher member having convexedly extending end to be received in said straw with said convexedly extending portion received against said piston member.

3,877,431

OSTOMY GASKET

Robert D. Kross, Bellmore, N.Y., assignor to Hydro Optics, Inc., New York, N.Y.

Filed Jan. 9, 1974, Ser. No. 432,068
Int. Cl. A61f *5/44*
U.S. Cl. 128—283 **4 Claims**

1. An ostomy sealing gasket designed to provide a seal between a post-surgical drainage pouch and the skin around the stomal opening comprising a flat sheet of polymeric material including an opening therethrough to receive the stoma of the patient, wherein said polymeric material comprises the reaction product of:
a. a compound selected from the group consisting of a hydroxyalkyl acrylate, a hydroxyalkyl methacrylate and mixtures thereof;
b. a polyalkylene glycol; and
c. a water-soluble reducing agent; the reaction carried out in the presence of water.

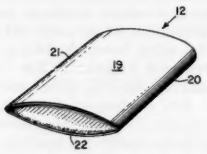
3,877,432

DISPOSABLE DIAPER WITH INTEGRAL DISPOSAL BAG

Dale A. Gellert, Milan, Ind., assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Oct. 20, 1965, Ser. No. 498,268
Int. Cl. A61f *13/16*
U.S. Cl. 128—287 **5 Claims**

1. A disposable diaper comprising an absorbent pad affixed to one face of a protective backsheet, said protective backsheet comprising two superposed generally rectangular plys of a substantially liquid impermeable web, said plys being united along the oppositely disposed side edge portions of each ply, said plys being free from one another inwardly of said side edge portions and along the end edge portions at each end of



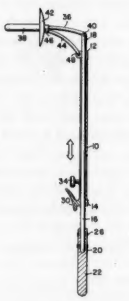
the ply so that subsequent to use said diaper may be turned partially inside out through either end opening formed between said end edge portions to form a pouch for encasing the soiled pad within a sheathing formed by said ply to facilitate disposal.

3,877,433

UTERINE ELEVATOR AND MANIPULATOR

Samuel Librach, Toronto, Ontario, Canada, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Nov. 5, 1973, Ser. No. 412,595
Int. Cl. A61b *1/00*
U.S. Cl. 128—303 R **4 Claims**

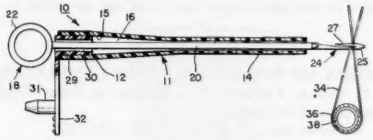


1. A medical instrument comprising:
an elongated hollow sleeve open at both ends;
an elongated bar disposed slidably in the sleeve with opposite ends disposed outside the sleeve;
a handle secured to one end of the bar;
a first linkage having a probe at one end and pivotally secured at its other end to the other end of the bar;
a second linkage pivotally secured at one end to the end of the sleeve adjacent the other end of the bar and at the other end to a point on the first linkage intermediate probe and sleeve; and
a cup disposed at right angles to the first linkage, said cup being secured to said first linkage at said point.

3,877,434
VASCULAR TOURNIQUET

Thomas B. Ferguson, Ladue; Norbert W. Burlis, University City, and Fred E. Satchell, Chesterfield, all of Mo., assignors to Sherwood Medical Industries, Inc., St. Louis, Mo.

Filed Feb. 11, 1974, Ser. No. 441,702
Int. Cl. A61b 17/12
U.S. Cl. 128—327 12 Claims

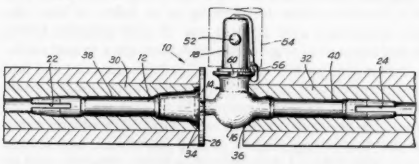


1. A vascular tourniquet comprising an elongate tubular sheath having proximal and distal ends, an elongate retractor extending through the lumen of said sheath and beyond both ends thereof, said retractor having a handle at its proximal end and a hook at its distal end, a cord or the like adapted to be positioned about a body vessel and engaged by said hook for drawing the ends of the cord through the lumen of the sheath and out its proximal end upon withdrawal of said retractor from said lumen, and a plug axially insertable from the exterior of said sheath into the proximal end of said sheath to secure the cord against axial movement with respect to said sheath.

3,877,435
IMPLANTING METHOD

Louis Bucalo, Holbrook, N.Y., assignor to Investors In Ventures, Inc., New York, N.Y.

Filed Feb. 12, 1973, Ser. No. 332,019
Int. Cl. A61b 17/11
U.S. Cl. 128—334 C 2 Claims

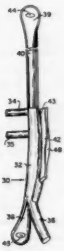


1. In a method for introducing an implant into a tubular organ of a living being, the steps of cutting transversely through the tubular organ to divide the latter into a pair of separate portions respectively having free ends located adjacent each other, introducing one part of an implant into the lumen of one of the separate portions of the tubular organ through the free end of the latter while maintaining said one part of said implant accessible at the latter free end, introducing another part of the implant into the lumen of the other of the separate portions of the tubular organ through the free end of the latter while maintaining said other part of said implant accessible at the latter free end, and then joining the parts of the implant directly to each other without any space therebetween, so that the entire implant is introduced into the lumens of the separate portions of the tubular organ without excessive stretching and displacement of the tubular organ during introduction of the implant into the latter, the tubular organ being a vas deferens and the implant being a valve, and including the steps of removing inner mucosa linings from the lumens of the separate portions of the vas deferens prior to introduction of the valve parts into the lumens so as to reduce the possibility of blocking valve passages during introduction of the valve parts into the lumen.

3,877,436
APPARATUS AND METHOD FOR MOLDING A NASAL CANNULA

Harold R. Havstad, Lakewood, Calif., assignor to Hudson Oxygen Therapy Sales Co., Temecula, Calif.

Division of Ser. No. 126,452, March 22, 1971. This application Feb. 9, 1973, Ser. No. 331,185
Int. Cl. A61m 25/00
U.S. Cl. 128—348 4 Claims

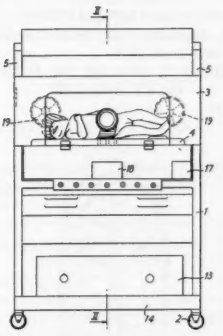


1. A molded device for forming a nasal cannula comprising: an elongated hollow tubular body
   b. a pair of hollow nasal tips extending from said tubular body; and
   c. a lipped slot extending along a portion of said tubular body adapted to be sealed and removed to form the cannula.

3,877,437
APPARATUS FOR SIMULTANEOUS BILATERAL PHOTOTHERAPY (PAN IRRADIATION) OF NEW-BORN CHILDREN

Francesco Maitan, 41 Via Capitano Sella, and Cosimo Vannucchi, Ospedale Civile di Schio, both of Schio, Vicenza, Italy

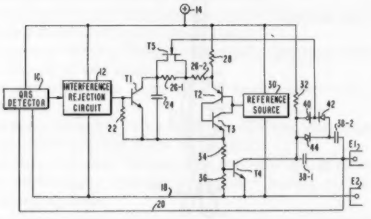
Filed July 6, 1973, Ser. No. 377,066
Claims priority, application Italy, July 20, 1972, 85602/72
Int. Cl. A61h 33/06
U.S. Cl. 128—373 4 Claims



1. Apparatus for simultaneous bilateral phototherapy (pan irradiation) of new-born children, particularly for the cure of babies stricken with neontal jaundice, characterised by the fact that it comprises a chamber made entirely of transparent material including the bed on which the child is placed and two groups of light sources placed respectively one above and one below the chamber in order to irradiate the entire surface of the new-born child's skin simultaneously in one treatment without having to submit the patient to continual changes of

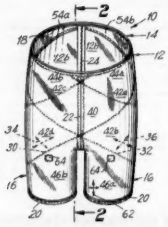
position, in order to obtain complete treatment of his skin and reduce in this manner the whole duration of his treatment.

3,877,438
PACER WITH SELF-ADJUSTING OUTPUT
Robert L. Cannon, Waltham, Mass., assignor to American Optical Corporation, Southbridge, Mass.
Filed Feb. 7, 1974, Ser. No. 440,621
Int. Cl. A61n 1/36
U.S. Cl. 128—419 PG **7 Claims**



1. A heart pacer comprising electrode means for connection to a patient's heart, pulser means for generating and applying stimulating pulses to said electrode means, timing means for controlling the generation of stimulating pulses by said pulser means in timed sequence, means for measuring the number of stimulating pulses generated by said pulser means, means responsive to said measuring means for controlling said pulser means to change a characteristic of subsequently generated pulses, said measuring means including a coulometer device having a characteristic which is a function of the total current which flowed through it, means for causing a current to flow through said coulometer device whenever said pulser means generates a stimulating pulse, said pulser means comprising two capacitors connected in parallel for furnishing a current pulse to said electrode means, said coulometer device being connected in series with one of said capacitors, and said measuring means including means for allowing a current flow in only one direction through said coulometer device.

3,877,439
FOUNDATION GARMENT
Jack J. Locascio, Bayonne, N.J., assignor to Rapid-American Corporation, New York, N.Y.
Filed Oct. 3, 1974, Ser. No. 512,271
Int. Cl. A41c 1/00
U.S. Cl. 128—547 **24 Claims**

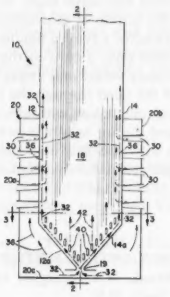


1. A body constricting garment adapted to encircle and control at least the lower torso of a wearer comprising:

a. a body-encircling frame at least the frontal portion of which includes stretch material, said body-encircling frame adapted to encircle at least the lower torso of a wearer from the waist area to the thigh area; and

b. two bands superimposed on and secured to said bodyencircling frame, each band extending from circumferentially spaced-apart areas at the upper front portion of said body frame and diagonally across the central frontal portion of said body frame to circumferentially spaced-apart areas at the lower front thigh area of said body frame so that said bands cross each other, said bands and said body frame having the ability to stretch where said bands cross whereby control and support areas are provided to selected frontal regions of said garment.

3,877,440
CURTAIN AIR SYSTEM FOR VAPOR GENERATORS
Justin P. Winkin, Fairlawn, N.J., assignor to Foster Wheeler Corporation, Livingston, N.J.
Filed Jan. 18, 1974, Ser. No. 434,737
Int. Cl. F22b 21/00
U.S. Cl. 122—235 B **12 Claims**

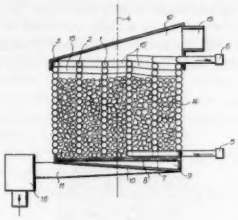


1. A furnace assembly comprising at least four vertically extending walls interconnected to form an enclosure, each of two opposite facing walls having a lower sloped end portion to form a hopper section terminating in an inlet, at least one burner associated with at least one of said opposite facing walls and adapted to combust an air-fuel mixture in said enclosure, first means for introducing air through said inlet and into the lower end of said enclosure, a plurality of openings formed through at least one wall connected to said wall associated with said burner, said openings being aligned in a plane parallel to the sloped end portion of said latter wall, and second means to introduce air through said openings, whereby said air rises in said enclosure adjacent the interior surfaces of said walls.

3,877,441
APPARATUS FOR HEATING FLUIDS
Jan Mach; Vaclav Rybar, and Radovan Drapal, all of Praha, Czechoslovakia, assignors to Stav Praha, vyrobni stavebni druzstno stredisko Monta, Prague, Czechoslovakia
Filed Aug. 13, 1973, Ser. No. 387,756
Claims priority, application Czechoslovakia, Aug. 14, 1972, 5631-72
Int. Cl. F22b 27/00
U.S. Cl. 122—250 R **10 Claims**

1. Apparatus for heating fluids and adapted for flameless combustion of a combustible gaseous mixture of a fuel and an oxidizing agent, said apparatus comprising a plurality of connected hollow jackets of similar construction through which the fluid to be heated flows, said jackets being of different diameters and being disposed coaxially one inside the other so as to form regular and continuous annular spaces of constant width between the opposite surfaces of successive jackets, a gas-permeable radiation substance filling the spaces between successive jackets and the space within the innermost jacket, said radiation substance being adapted to be brought into a

thermal condition in which it radiates substantially the entire thermal energy liberated at its surface, said substance being in intimate contact with the surfaces of said jackets by which it is surrounded and enclosed, a casing at the bottom of said jackets, the casing being common to all of the jackets at the



bottoms thereof, means in said casing for homogenizing the combustible gaseous mixture, and distribution means in said casing for distributing the homogenized combustible gaseous mixture to the radiation substance filling the spaces between successive jackets and the space within the innermost jacket.

3,877,442

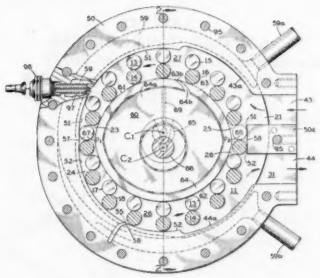
4-STROKE DISPLACEMENT GAS TURBINE ENGINE OR PUMP

Lloyd E. Miller, Jr., 8330 SW 52nd Ave., Miami, Fla. 33143

Filed Oct. 5, 1973, Ser. No. 404,011

Int. Cl. F02b *53/00*; **F01c** *1/08*; **F04c** *17/04*

U.S. Cl. 123—8.45 **13 Claims**



1. A positive displacement device employing a pair of parallel gear wheels which are rotatable on separated axes,

gear teeth circularly disposed on the face of each of said wheels which teeth intermesh with said teeth on the opposite of said wheels,

a housing and core member sealingly disposed between said wheels which define a generally annular track in which said teeth revolve,

said teeth dividing said track into sealed working chambers whose volumes each contract and expand twice during one revolution of said wheels,

and port means for providing the ingress and egress of fluid, respectively, to and from said chambers.

3,877,443

CIRCULATING COOLING INSTALLATION FOR PISTON INTERNAL COMBUSTION ENGINES

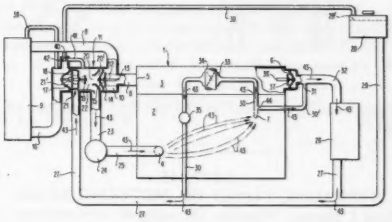
Richard Henning, Munich, and Erwin Schweiger, Dachau, both of Germany, assignors to Bayerische Motoren Werke Aktiengesellschaft, Munich, Germany

Filed Mar. 22, 1974, Ser. No. 453,950

Claims priority, application Germany, Mar. 22, 1973, 2314301

Int. Cl. F01p *7/14*

U.S. Cl. 123—41.08 **15 Claims**



1. A circulating cooling installation for piston internal combustion engines, which comprises cooling jacket means and control means operable to limit the cooling medium circulation through the cooling jacket means at least within the area of the combustion zones of the engine up to a first predetermined limit value after the cold start of the engine, above the first predetermined limit value to initially confine the circulation to a closed circulation by-passing a radiator means and avoiding a fresh water exchange, and above a further predetermined temperature limit value to include in the cooling medium circulation the radiator means and at least one of heat-exchanger means and fresh water exchange, the control means including a first means and a three-way thermostat means each having a separate control element, the first means being actuated after reaching the first limit value and the three-way thermostat means being actuated after reaching the further temperature limit value, characterized in that the control element of said first means is arranged at a place at which at least approximately the highest occurring cooling medium temperature becomes effective when the cooling medium stands still, whereas the control element of the three-way thermostat means is disposed in the flow area of the closed circulation.

3,877,444

INTAKE SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Akihisa Senga, Asaki, and Yoshiaki Hidaka, Wako, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed July 2, 1973, Ser. No. 375,503

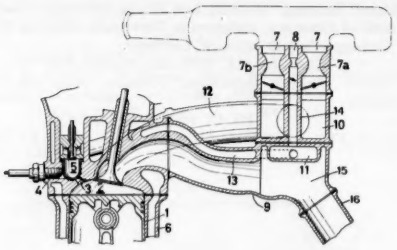
Claims priority, application Japan, July 4, 1972, 47-78302

Int. Cl. F02b *19/10*, *19/18*

U.S. Cl. 123—75 B **3 Claims**

1. An intake system for an internal combustion engine having an auxiliary combustion chamber associated with each main combustion chamber, comprising: a main carburetor having two parallel throats; an auxiliary carburetor located between said two throats; a main heating chamber in communication with said main carburetor; an auxiliary heating chamber in communication with said auxiliary carburetor; an exhaust manifold in juxtaposition with said main heating chamber; the auxiliary heating chamber being positioned within said exhaust manifold; a conduit connecting the auxiliary carburetor to the auxiliary heating chamber, said conduit passing through the main heating chamber; passageway means

from said main heating chamber to the main combustion chambers of the engine; and passageway means from said



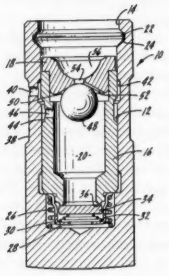
auxiliary heating chamber to the auxiliary chambers of the engine.

3,877,445

HYDRAULIC TAPPET OIL METERING MEANS

William I. Barnes, Wheaton, Ill., assignor to Stanadyne, Inc., Windsor, Conn.

Filed Nov. 19, 1973, Ser. No. 416,940
Int. Cl. F01m *1/06*
U.S. Cl. 123—90.35 **6 Claims**



1. In a tappet, a tappet body having a bore therein, a hollow plunger reciprocally mounted in said body bore, an oil chamber within said hollow plunger, cooperating oil passage means between the exterior of said body and said oil chamber, spring means positioned in said bore normally urging said plunger outwardly therefrom,

said plunger having a plunger cap and an oil orifice in said plunger cap communicating with said chamber, and a floating totally unconfined metering element in said chamber, the specific gravity of the floating metering element being less than the specific gravity of oil, cooperating metering means on said element and plunger cap for controlling the flow of oil through said orifice.

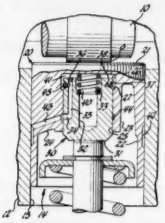
3,877,446

HYDRAULIC VALVE LIFTER

Robert E. Morgan, Grand Rapids, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 21, 1974, Ser. No. 499,272
Int. Cl. F01l *1/14*
U.S. Cl. 123— **7 Claims**

1. A self-adju...g hydraulic valve lifter including an outer member of cylindrical cup shape closed at one end by a head and provided with a cylindrical recess at its opposite end to receive the stem of a valve, said head having a central boss integral therewith extending axially into said recess, said boss having a stepped bore therein including a first bore of a predetermined diameter extending from the free end of said boss and a second bore of a larger diameter, said first bore and said second bore meeting coaxially with an intervening radial extending shoulder, a plunger of cylindrical cup shape journalled for reciprocal movement in said first bore of said outer member in oppositely presenting relation to said outer member, said plunger having a cylindrical recess extending from one end and a head closing the opposite end thereof, said plunger being of an axial length such that the closed end of said inner member extends axially outward of said first bore from said boss and the open end of said plunger extends into said second bore, said plunger defining with the peripheral



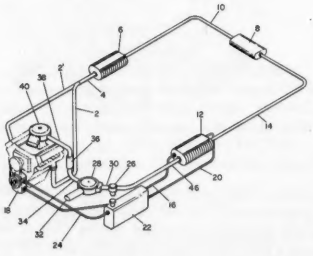
surface around said second bore and the interior surface of said head within said outer member a fluid chamber, spring means positioned in said fluid chamber for abutment against said plunger and said outer member to normally bias said plunger in one axial direction relative to said outer member and, oil supply passage means including an O-ring valve for supplying and maintaining a body of hydraulic fluid in said fluid chamber, said oil supply passage means including at least one supply channel means in said outer member and at least one supply passge in communication with a V-shaped annular groove opening into said fluid chamber, said O-ring valve being positioned in said V-shaped groove for controlling the one-way flow of fluid from said supply passage to said fluid chamber.

3,877,447

EXHAUST SUPERCHARGER

Paul Lawrence Ross, Sr., Denver, Colo. 80287

Filed Mar. 1, 1973, Ser. No. 336,938
Int. Cl. F02m *25/06*
U.S. Cl. 123—119 A **3 Claims**



1. An exhaust supercharger apparatus intended for mounting to the exhaust pipes and air cleaner and water pump of a conventional internal combusion vehicle engine, the apparatus comprising, in combination:

an air cooled muffler having an inlet pipe adapted to be connected to the exhaust pipes of said engine, and an outlet pipe;

a sound reducing muffler having an inlet port and an outlet port;
an exhaust pipe adapted to connect said outlet pipe of said air cooled muffler to said inlet port of said sound reducing muffler;
a water cooled muffler having an inlet pipe and an outlet pipe;
an exhaust pipe adapted to connect said outlet port of said sound reducing muffler to said inlet pipe of said water cooled muffler;
a vapor trap having an inlet and an outlet;
a pipe adapted to connect said outlet pipe of said water cooled muffler to said inlet of said vapor trap;
an air-exhaust mixing chamber including means for mixing fresh air with exhaust gasses, said chamber having an inlet and an outlet;
a pipe connecting said outlet of said vapor trap to said inlet of said air-exhaust mixing chamber;
an elongated cylindrically shaped filter having an inlet and an outlet;
a pipe adapted to connect said outlet of said air-exhaust mixing chamber to said inlet of said filter;
a pipe adapted to connect said outlet of said filter to an inlet tube of said air cleaner of said engine;
a water reservoir having an inlet port and an outlet port;
a water jacket formed integrally with said water cooled muffler and having an inlet and an outlet; and
water carrying tube means interconnecting said water reservoir to said water cooled muffler and to said water pump for maintaining water flowing through said water jacket.

3,877,448

CARBURETORS FOR INTERNAL COMBUSTION ENGINES

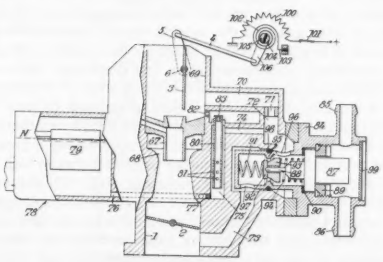
Werner Schmid, Esslingen, Germany, assignor to Societe Industrielle de Brevest et d'Etudes S.I.B.E., Neuilly-sur-Seine, France

Filed Jan. 8, 1974, Ser. No. 431,781

Claims priority, application France, Jan. 11, 1973, 73.00950

Int. Cl. F02m *1/10*

U.S. Cl. 123—119 F **4 Claims**



1. Carburettor for an internal combustion engine, comprising: an intake pipe; an operator actuatable main throttle member in said pipe; a main fuel jetting system which opens into said pipe upstream of said throttle member for providing fuel to the engine during operation thereof under load; and an auxiliary cold starting device responsive to the temperature of the engine to increase at least the flow rate of fuel delivered to the intake pipe, said auxiliary device including a passage which opens into said intake pipe downstream of the main fuel jetting system, a closure valve in said passage, means for delivering an air fuel mixture of predetermined richness to said passage upstream of said closure valve, first temperature responsive means for closing said closure valve when heated to a first predetermined temperature, a starting choke valve located in said intake pipe upstream of the main jetting system, and second temperature responsive valve actuating means for moving said starting choke valve from a minimum opening to a more broadly open position when heated to a second predetermined temperature, wherein said temperature responsive means are constructed and arranged for the choke valve to be moved from its minimum opening position before the closure valve is closed following starting of the engine.

3,877,449

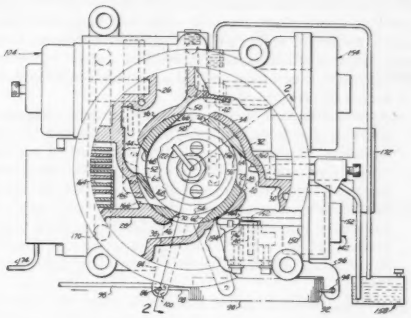
PRESSURE CARBURETOR SYSTEM FOR MANIFOLD DISTRIBUTION

Carl F. High, 17581 Appoline, Detroit, Mich. 48235

Continuation-in-part of Ser. No. 119,591, March 1, 1971, abandoned, which is a continuation-in-part of Ser. No. 11,572, Feb. 16, 1970, abandoned. This application June 14, 1973, Ser. No. 363,946

Int. Cl. F02b *33/00*; **F02m** *7/00*

U.S. Cl. 123—119 R **14 Claims**

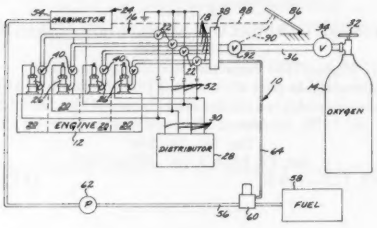


1. In an internal combustion engine having an intake manifold adapted to distribute a fuel-air mixture to engine cylinders, a fuel-air charge forming system comprising:
a carburetor housing having a mixing chamber defined by a cylindrical recess open at one end for communication at all times openly and directly with said intake manifold and closed at the opposite end, a liquid fuel nozzle carried at said closed end substantially at the chamber axis and adapted to inject an atomized fuel spray substantially axially into said chamber toward said open end,
means for regulating fuel flow to said nozzle,
at least one air intake passage in said housing directing air to an intake port opening into the side of said mixing chamber,
valve means disposed within said housing adjacent said mixing chamber and operable upon actuation to regulate air flow into said mixing chamber,
means connecting said fuel flow regulating means and said valve means to increase air flow into said chamber as fuel flow increases and to decrease the air flow into said chamber as fuel flow decreases; and
said intake passage and said valve means being formed to direct air tangentially to said intake port to swirl air inwardly into said mixing chamber for mixing with the liquid fuel spray from said fuel nozzle prior to discharge into said manifold.

3,877,450
INTERNAL COMBUSTION ENGINE POLLUTION CONTROL APPARATUS

Thomas Meeks, Compton, Calif., assignor to Matt Perdue, Long Beach, Calif., a part interest

Filed June 4, 1973, Ser. No. 366,642
Int. Cl. F02d *21/02*
U.S. Cl. 123—119 E **8 Claims**



1. In an internal combustion engine having means for introducing predetermined quantities of fuel and air into the engine cylinders; spark plugs for said cylinders, respectively; and ignition means for sequentially applying current pulses to said spark plugs to effect ignition of the fuel and air mixtures in said cylinders, a pollution control apparatus comprising:

a source of pressurized oxygen;

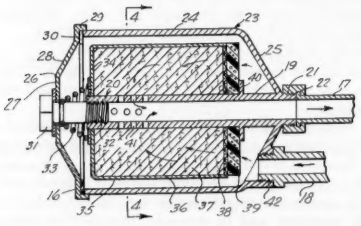
oxygen distribution means, including conduits arranged to carry oxygen from said source for introduction into said cylinders, respectively, and further including normally closed flow control devices in said conduits, respectively, each responsive to a current impulse to open and allow a predetermined quantity of oxygen to pass through the associated one of said conduits whereby oxygen may be introduced into said cylinders in predetermined sequence for mixture with said fuel and air prior to said ignition; and

leads electrically coupling said spark plugs and said flow control devices, respectively, in parallel whereby application of current impulses to said spark plugs also operates said flow control devices, the coupling of said leads being such that the flow control device for each cylinder is operated ahead of the spark plug for that cylinder.

3,877,451
PCV VALVE FILTER

Virgil J. Lipscomb, c/o General Delivery, Loomis, Calif. 95691

Filed Dec. 28, 1973, Ser. No. 429,263
Int. Cl. F07f *9/00, 25/06*
U.S. Cl. 123—119 B **1 Claim**

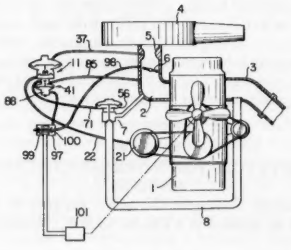


1. A PCV valve filter for internal combustion engines of the type which include a crankcase, an intake manifold and a PCV valve connecting said crankcase to said intake manifold for venting the fumes from the intake manifold comprising a hollow stem having an internally threaded end portion and an externally threaded opposite end portion, a housing secured on said stem and having said stem extending therethrough, a cover mounted on said housing, a securing element extending through said cover and engaging the internally threaded end portion of said stem, said stem having a plurality of openings therein, a filter material cartridge arranged in said housing surrounding said stem, resilient means mounted on said securing element adjacent said cover for supporting said cartridge in position on said stem, a mounting bracket securing said housing to said engine and a pair of hoses detachably secured to said housing and connected between said PCV valve and said crankcase.

3,877,452
EXHAUST GAS RECIRCULATION SYSTEM

Hidetaka Nohira, and Kiyoshi Kobashi, both of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Mar. 28, 1974, Ser. No. 455,880
Claims priority, application Japan, May 24, 1973, 48-57239
Int. Cl. F02m *25/06*
U.S. Cl. 123—119 A **3 Claims**



1. An exhaust gas recirculation system for an internal combustion engine in which the exhaust and suction systems are communicated with each other by a conduit provided with a control valve, characterized in that said control valve is opened or closed by a pressure amplifying unit so as to recirculate exhaust gas into the suction system corresponding to variation of negative pressure in the suction system, said pressure amplifying unit comprising a first diaphragm and a second diaphragm arranged to divide the interior of the housing into three chambers, a first chamber defined by said first diaphragm so that compressed air will be introduced thereinto from a pressure source, said first chamber having a pressure outlet portion, a second chamber defined between said first and second diaphragms and communicated with the atmosphere, a third chamber defined by said second diaphragm so that negative pressure adjacent a venturi in the suction system will be introduced thereinto, a valve mounted on said first diaphragm to control communication between said first and second chambers, and an operating member mounted on said second diaphragm to operate said valve.

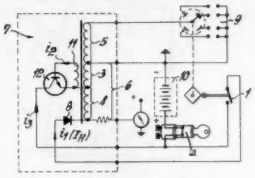
3,877,453
IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES

Heinrich-Josef Brungsberg, Ludenscheid, Germany, assignor to Brown, Boveri & Cie A.G., Mannheim, Germany

Filed Jan. 19, 1973, Ser. No. 324,945
Claims priority, application Germany, Jan. 28, 1972, 2203938
Int. Cl. F02p *3/02*
U.S. Cl. 123—148 E **4 Claims**

1. An ignition system for internal combustion engines comprising

a. means forming a high-voltage circuitry including spark plug means (9) and a secondary winding (5);
b. means forming a low voltage circuitry including a primary winding (6) inductively coupled with said secondary winding (5), said primary winding (6) having a first small resistance section (3) allowing rapid build-up of current therein and a second high resistance section (4) serially connected with said first section (3);
c. switching means (1) for initially connecting said first section (3) and said second section (4) serially to said d-c power source;

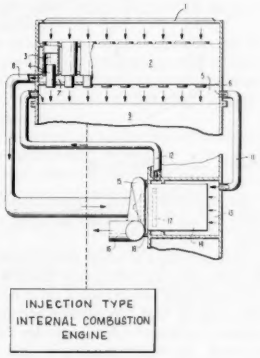


d. a shunt-circuit by-passing said second section (4) to allow energization by said d-c power source (10) of said first section (3) only, said shunt-circuit including a transistor (12) for controlling the flow of current therein;
e. a tertiary winding (11) inductively coupled with said primary winding (6) and providing the control current for said transistor (12); and
f. a diode (8) arranged to preclude current flow in said second section (4) while said first section (3) is energized by a current flowing through said transistor(12).

3,877,454
AIR SEPARATOR

Franz Axmann, Fellbach, and Jurgen Wahnschaffe, Cologne, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart-Untertuerkheim, Germany

Filed Apr. 27, 1972, Ser. No. 247,975
Claims priority, application Germany, Apr. 27, 1971, 2120481
Int. Cl. B01d *50/00*
U.S. Cl. 123—198 E **8 Claims**

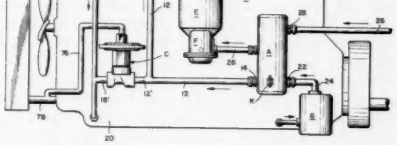


1. An air filter comprising
filter housing means having a suction inlet air opening, particle separating means connected downstream of said inlet air opening for separating impurities from air introduced through said inlet air opening, impurity collecting means connected to said particle separating means for collecting impurities separated from the inlet air, and a space disposed downstream of said particle separating means for collecting fresh filtered air;
vacuum blower means connected to said filter housing means for removing from said housing means impurities collected in said impurity collecting means; and
motor means connected to said vacuum blower means for driving said vacuum blower means, said motor means projecting into said space such that said fresh filtered air provides cooling air to said motor means,
wherein a chamber means is provided for enclosing said motor means, and said housing means includes a branch air line means for supplying said fresh filtered air from said housing means to said chamber means, said branch air line means having a return line connected between said chamber means and said housing means for returning said fresh filtered air to said housing means from said chamber means so that said fresh filtered air is circulated to said motor means and returned to said housing means, said motor means including a fan mounted on the shaft of said motor means for enhancing circulation of said fresh filtered air over said motor means within said chamber.

3,877,455
ENGINE PROTECTIVE SYSTEM

Joe E. Goodwin, Conroe, Tex., assignor to Sentinel Distributors, Inc., Denver, Colo.

Filed May 11, 1973, Ser. No. 359,598
Int. Cl. F02b *77/00*
U.S. Cl. 123—198 D **4 Claims**



1. In apparatus for controlling the flow of fuel to an internal combustion engine in response to pressure and temperature conditions existing in the pressure lubricating system and the cooling system of the engine of the type comprising a valve in the fuel supply line of the engine, pressure actuated means normally subject to the pressure of the oil in said lubricating system for maintaining said valve in open position as long as the pressure exerted on said means is at least equal to a predetermined value, means operable to close said valve when the pressure exerted on said pressure actuated means drops below said predetermined value, and means responsive to the temperature of the coolant in said cooling system for reducing the pressure on said pressure actuated means below said predetermined value when said temperature rises above a predetermined temperature, the improvement which comprises:
the inclusion in said apparatus of means responsive to the flow pressure of the coolant in said cooling system for reducing the pressure on said pressure actuated means below said predetermined value when the flow pressure of the coolant drops below a predetermined pressure even though the temperature of the coolant remains below said predetermined temperature, the coolant flow pressure responsive means comprising a valve housing having an inlet connected to the pressure side of the lubricating system and an outlet connected to the non-pressure side of said system, a valve in said body controlling the flow of oil between said inlet and outlet, means subject to the flow pressure of the coolant in the cooling system for maintaining said valve in closed position when said coolant flow pressure is at least equal to a predeter-

mined pressure, and yieldable means for opening said valve when the coolant flow pressure drops below said predetermined pressure.

3,877,456

RADIUSING DRESSING APPARATUS

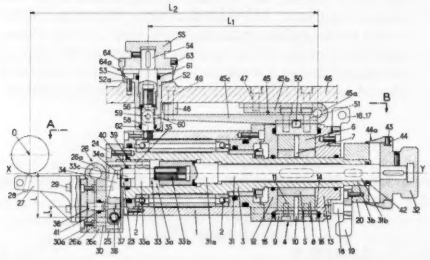
Gerard Druge, Cran Gevrier, and Rene LaCombe, Annecy, both of France, assignors to Societe Anonyme dite: Societe Nouvelle de Roulements, Annecy, France

Filed May 13, 1974, Ser. No. 469,569

Claims priority, application France, July 10, 1973, 73.25270

Int. Cl. B24b *53/06*

U.S. Cl. 125—11 A **8 Claims**



1. A radiusing dressing device of the type employed to dress the periphery of a grindstone to a part toroidal form, and comprising a support, an outer housing, a spindle, means mounting said spindle for pivotal movement about its longitudinal axis without backlash within said housing, means for pivoting said spindle through a limited angle, in either sense, about said longitudinal axis, a first unitary chuck mounting said outer housing on said support, said first chuck being deformable in a first direction and having a high rigidity in a second direction perpendicular to said first direction, a second unitary chuck mounted on one end of said spindle and supporting a right-angled diamond carrier, said second chuck being deformable in one direction and having a high rigidity in a perpendicular direction, each of said chucks having a respective precision adjustment means adapted to place the respective chuck in tension and to deform it to provide, in the case of said first chuck, adjustment of the position measured substantially perpendicular to said longitudinal axis of said longitudinal axis with respect to said support and in the case of said second chuck adjustment of the position of said diamond carrier with respect to said longitudinal axis.

3,877,457

HEATING APPLIANCE CONTROL PANEL STRUCTURE

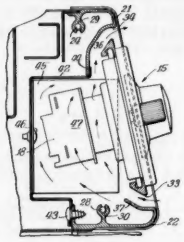
John T. Doner, Marion, Ohio, assignor to Whirlpool Corporation

Filed Jan. 2, 1974, Ser. No. 430,174

Int. Cl. F24c *15/00*

U.S. Cl. 126—39 R **13 Claims**

1. In a range having a lower oven portion provided with a front door, an upper cooktop portion, and control means for controlling the operation of the oven and cooktop heating means including manual operating portions, means for mounting the control means suitably to effectively prevent damage to the control means by heat from the range and maintain exposed portions of the mounting means and control means below a preselected temperature, said mounting means comprising: a mounting panel; means for mounting said panel to the front of said range above said door; and wall means mounted to said range defining with the mounting panel a lower, inlet opening below said panel, an upper, outlet opening above said panel, and an air flow passage behind said panel for conducting all of the air entering said inlet opening to said outlet opening, the control means being mounted to said mounting panel to be cooled directly by air flowing through said air flow passage and with said manual operating portions disposed forwardly of the mounting panel for adjustment of the controls by a user, said air flowing through said passage further serving to maintain the temperature of the exposed



surface of said mounting means and manual operating portions of the control means below a preselected temperature, said walls means preventing air flow from between said oven and cooktop portions to said flow passage, said openings having a horizontal length substantially equal to the width of said oven door.

3,877,458

PORTABLE STOVE

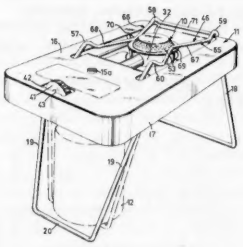
Claes Vilhelm Allander, Stockholm, Sweden, assignor to Aktiebolaget Optimus, Upplands Vasby, Sweden

Filed Feb. 4, 1974, Ser. No. 438,521

Claims priority, application Sweden, Feb. 2, 1973, 7301471

Int. Cl. F24c *5/20*

U.S. Cl. 126—44 **9 Claims**



5. A portable stove comprising:

a burner assembly;

a stand for supporting said burner assembly, said stand including means for releasably securing a disposable fuel cartridge to said stand;

said stand comprising a metallic sheet forming a top surface and downwardly depending side flanges;

said burner assembly comprising a valve housing secured to the underside of said top surface and having means for releasable coupling to a fuel cartridge outlet;

a burner head; an outlet opening in said housing; a tube connecting the burner head to the housing outlet opening;

a hollow elongated vaporizing pipe extending between a pair of openings in said valve housing for coupling the inlet coupling means to the housing outlet opening;

said top surface having a recessed opening for receiving said burner head;

said vaporizing pipe being arranged to form a loop having a portion thereof in close proximity to said burner head

for vaporizing fuel passing therethrough towards said burner head;

the looped portion of the vaporizing pipe serving as a means for supporting a cooking utensil a spaced distance above said burner head.

3,877,459

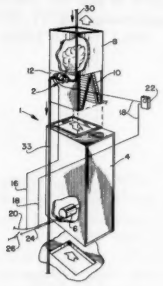
ATOMIZING HUMIDIFIER FOR CENTRAL HEATING SYSTEMS

John S. Harvey, 4809 Marsha Ln., Wichita Falls, Tex. 76302

Filed Dec. 21, 1973, Ser. No. 427,423

Int. Cl. F24f *3/14*

U.S. Cl. 126—113 **4 Claims**



1. In combination with a central heating system having a furnace with ducts leading therefrom;

a. a water inlet supply conduit leading from a source of water under pressure,

b. a solenoid actuated valve, the body of which is made of plastic, mounted on the outlet duct leading from the furnace, which valve is in fluid communication with the water inlet supply conduit,

1. said solenoid actuated valve having the discharge thereof in position to discharge water into the duct leading from the furnace,

2. at least one plastic nozzle connected in fluid communication with said discharge of said solenoid valve to atmoize water which is discharged into the duct leading from the furnace,

3. a moisture receiving tray mounted on said valve body and positioned near the discharge end of said nozzle,

4. said moisture receiving tray having a passage formed therein, which passage leads therefrom to convey moisture from said tray,

5. a solenoid mounted on said solenoid actuated valve,

6. an armature within said solenoid of said solenoid actuated valve and extending into said valve,

7. a valve seat on said solenoid armature,

8. said plastic body of said solenoid actuated valve having passages formed therein to direct water from said water inlet supply conduit to said valve seat on said armature,

9. a complementary valve seat in said valve body surrounding the water discharge of said body, so when said valve seat is in open position, water will be directed therethrough.

3,877,460

OVEN DOOR

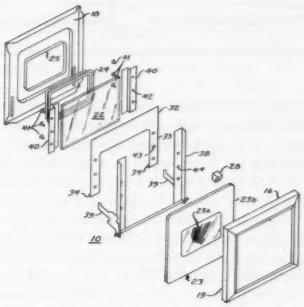
Larry C. Lotz, Marion, and Thomas D. Ford, Larue, both of Ohio, assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Feb. 1, 1974, Ser. No. 438,864

Int. Cl. F23m *7/04*

U.S. Cl. 126—200 **19 Claims**

9. A hollow heat insulating door for a cooking oven, comprising: a peripheral closed frame comprising a marginal wall and spaced apart inner and outer panels having aligned viewing openings, the opening in said outer panel being vertically substantially larger than the opening in the inner panel; an inner glass pane on the inner panel spanning the inner viewing opening; an outer glass pane on the outer panel spanning the outer viewing opening, said outer pane being substantially larger than said inner pane and being semi-opaque with interior artificial light shining therethrough but outer natural light being substantially barred; means sealing one of said panes to its said panel, said panels and panes providing an interior insulating dead air space; and a heat absorbing baffle in said dead air space for limiting heat transfer through the door, said heat absorbing baffle comprising a black coated steel sheet having an upper portion spaced outwardly of said inner panel above said inner glass pane and spaced inwardly of the upper portion of the outer glass pane and defining an opening providing unimpeded viewing of the oven through said aligned panel viewing openings.



3,877,461

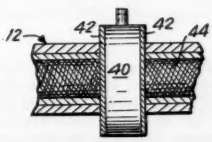
DEVICE FOR CONTROLLING BODY FLUIDS

Louis Bucalo, Holbrook, N.Y., assignor to Investors in Ventures, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 155,141, June 21, 1971, Pat. No. 3,742,933. This application July 2, 1973, Ser. No. 375,360

Int. Cl. A61b *19/00*

U.S. Cl. 128—1 R **3 Claims**

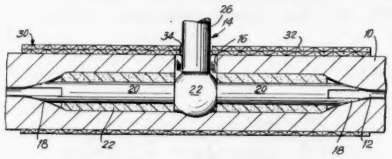


1. For use in a body cavity of a living being, a vas valve implant adapted to be situated in a vas deferens and a spermicidal agent material carried by the implant at the exterior thereof for effecting a predetermined spermicidal influence on sperm in a body fluid encountered by the implant at the body cavity when the sperm is situated at the exterior of the implant, the material being in the form of a holding means for holding the vas valve in the vas deferens.

3,877,462
INGROWTH SHROUD AND IMPLANTING METHOD UTILIZING THE SAME

Louis Bucalo, Holbrook, N.Y., assignor to Inventors In Ventures, Inc., New York, N.Y.

Filed Oct. 19, 1973, Ser. No. 407,991
Int. Cl. A61b *19/00*
U.S. Cl. 128—1 R **7 Claims**

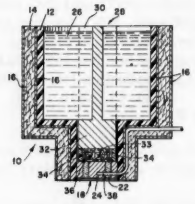


1. For use in connection with an implanting procedure, an elongated implant adapted to be situated in the interior of a body organ with said implant having opposed end regions beyond which the body organ is adapted to extend, and ingrowth shroud means adapted to surround the body organ at the region thereof where the implant is located, said ingrowth shroud means being adapted to extend along the exterior of the body organ beyond the opposed ends of the implant for reinforcing the organ to prevent kinking thereof at the ends of the implant, said ingrowth shroud means having, for engagement with the organ, a surface of sufficient porosity to promote the ingrowth of tissue between the organ and the ingrowth shroud means.

3,877,463
THERMAL METHOD AND DEVICE FOR THE DIFFERENTIAL DIAGNOSIS OF HUMAN TUMORS AND CIRCULATORY DISORDERS

John D. Cary, Brookline, and Borivoje B. Mikic, Cambridge, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed July 2, 1973, Ser. No. 376,066
Int. Cl. A61b *5/00*
U.S. Cl. 128—2 H **22 Claims**



1. A device for determining the perfusion rate of superficial skin tissue by measuring the temperature of skin after the superficial tissue has been cooled below its normal temperature comprising:

a flat heat collecting surface having a defined area which can be placed in thermal communication with the skin and enable heat transfer from the skin to said heat collecting surface;

a heat sink means for cooling said heat collecting surface to enable the superficial tissue to be cooled below its normal temperature when said heat collecting surface is placed in thermal communication with the skin;

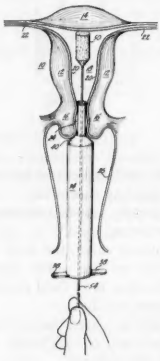
a thermal resistance connected between said heat collecting surface and said heat sink means including spacer means for defining the height of said thermal resistance, said heat sink means cooling said heat collecting surface through said thermal resistance to a temperature above the value of the heat sink means at steady state; and,

means for measuring the temperature of skin when cooled by said surface, the device being designed so that the value of the thermal resistance, the heat sink means temperature, and the area of the heat collecting surface maximize the skin temperature difference for different perfusion rates.

3,877,464
INTRA-UTERINE BIOPSY APPARATUS

Andrew R. Vermes, 1020 Fifth Ave. West, Olympia, Wash. 98501

Continuation-in-part of Ser. No. 260,370, June 7, 1972, abandoned. This application Aug. 17, 1973, Ser. No. 389,361
Int. Cl. A61b *10/00*
U.S. Cl. 128—2 B **7 Claims**



1. Biopsy apparatus for collecting cell matter from the endometrium of the uterus, comprising:

a tubular, thin-walled, introducer member having an opening at both ends;

said member comprising a hollow, lead portion adapted to be comfortably introduced through the cervix into the endocervical passage and to reach the uterine cavity;

said member also comprising an integral hollow elongated follower portion of substantially increased cross-section relative the cross-section of said lead portion and coaxially associated with the hollow of said lead portion whereby to provide a roomy chamber adjacently outward of said lead portion;

said introducer member having externally between the rear of said lead portion and the front of said follower portion an integral, annular, smoothly-faired shoulder defining means to limit the depth of penetration of the forward end of said lead portion into the uterine cavity;

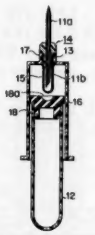
a surface-abrading biopsy sponge of a size to pass through said hollow lead portion; and

an elongated flexible shank having its forward end securely embedded in the rear of said sponge, said shank being disposed within said introducer member and being materially smaller in cross-section than the hollow of said lead portion and of a length to extend through said introducer member and outward of the chamber of said follower portion when the sponge is inserted into the uterine cavity.

3,877,465
FLUID COLLECTION DEVICE

Sanae Miyake, Tokyo, Japan, assignor to Jintan Terumo Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 208,246, Dec. 15, 1971, abandoned, which is a continuation-in-part of Ser. No. 56,283, July 20, 1970,. This application Oct. 9, 1973, Ser. No. 404,659
Claims priority, application Japan, Oct. 17, 1969, 44-98595
Int. Cl. A61b *5/14*
U.S. Cl. 128—2 F **1 Claim**

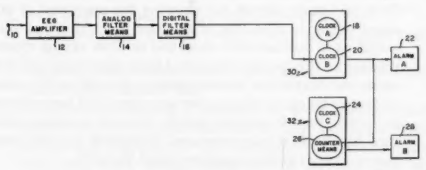


1. A blood transfer device comprising a tubular container holder having an open end and a closed end, a double-ended, hollow needle fitted to the closed end of the holder through a hub parallel to the longitudinal axis of said holder and having its rear end within the interior of the holder and its front end outside the holder, a needle puncturable, self-sealing, rubber elastic sheath sealingly enveloping said rear end of the needle, a cylindrical container having a closed end and an open end in which a stopper is sealingly attached, said container extending at said open end at least part way into said holder, said needle being 0.7 to 0.9 mm in outer diameter, said elastic sheath being 0.7 to 0.8 mm in wall thickness and having a closed hemispherical end portion, the clearance between the inner surface of said hemispherical end portion of the sheath and the rear end of the needle being 1 to 3 mm, and the clearance between the inner side wall of the sheath and the opposed side wall of the needle being 0.1 to 0.5 mm and, when upon further movement of said container into the holder said rear end of the needle pierces the container stopper, the sheath is pressed by the container stopper to have said hemispherical top portion punctured by said rear end of the needle and collapsed toward said hub and to allow said rear end of the needle member to communicate with the fluid sample container, thus assuming a position at which the fluid is permitted to be conducted through the needle to the fluid sample container, and upon removal of the needle member from the fluid sample container, the sheath spontaneously regains its original position enveloping the rear end of the needle.

3,877,466
ATTENTION-LEVEL ANALYZER

Karel Montor, 732 Cottonwood Dr., Severna Park, Md. 21148

Filed Jan. 22, 1974, Ser. No. 435,556
Int. Cl. A61b *5/04*
U.S. Cl. 128—2.1 B **8 Claims**



1. Apparatus for determining the level of attention of a human subject comprising, in combination:

wave-detection means adapted for connection to the subject's head for obtaining an electrical wave output corresponding to the brain waves of the subject;

filter means for filtering said electrical wave output, said filter means passing signals having frequencies lying in the attentiveness band and cutting off lower and higher frequency signals;

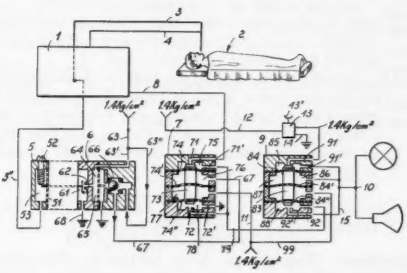
first clocking means to which the output of the filter means is fed as an input for establishing repeatable time intervals and for producing an output signal if the cumulative duration of inattentiveness signals exceeds a predetermined amount of time for a given timing interval; and

first alarm means for producing an alarm signal upon receipt of an output signal from said clocking means.

3,877,467
ARTIFICIAL RESPIRATION SYSTEM

Gianni Plicchi, Via Cimarosa 2, Bologna, Italy

Continuation-in-part of Ser. No. 239,977, March 31, 1972, abandoned. This application Dec. 5, 1973, Ser. No. 422,029
Claims priority, application Italy, Apr. 16, 1971, 23255/71
Int. Cl. A61b *5/08*
U.S. Cl. 128—2.08 **9 Claims**



1. An artificial respiration system comprising, in combination, respirating means for alternately forcing air into the lungs of a patient during an inhalation period and permitting outflow of air from the lungs of the patient during a subsequent exhalation period; synchronizing means for generating a synchronizing signal indicative of the time intermediate said inhalation period and said exhalation period; warning means for issuing a warning signal; pressure-detecting means for detecting when the pressure of air in the lungs of the patient falls below a predetermined value; and activating means connected to said synchronizing means for receipt of said synchronizing signal and connected to said pressure-detecting means and operative for causing said warning means to issue a warning signal if the pressure detected by said pressure-detecting means falls below said predetermined value during the time of receipt by said activating means of said synchronizing signal.

3,877,468
CHEWABLE TOBACCO SUBSTITUTE COMPOSITION

Stefan Lichtneckert; Claes Lundgren, both of Lund, and Ove Ferno, Halsingborg, all of Sweden, assignors to Aktiebolaget Leo, Halsingborg, Sweden

Continuation of Ser. No. 164,105, July 19, 1971, abandoned. This application Jan. 28, 1974, Ser. No. 437,031
Claims priority, application United Kingdom, July 22, 1970, 35605/70; July 22, 1970, 35606/70
Int. Cl. A24b *15/00*
U.S. Cl. 131—2 **3 Claims**

1. A chewable "substitute for smoking" gum composition, having a "high percentage" of gum base, as said "high percentage" is hereinafter defined, comprising:

1. a chewing gum base and
2. nicotine, substantially uniformly distributed in said chewing gum base,

wherein:

A. the composition is in the form of a chewable gum unit weighing in the range of about 0.5 to about 4 grams;

B. the chewing gum base is present in said gum composition in a relatively high percentage, that is, an amount constituting at least about 40 percent by weight of said gum composition;

C. the nicotine is present in said composition in an amount in the range of about 0.05 weight percent to about 2 weight percent based on the weight of the chewing gum base and calculated as the free base;

D. the amount of nicotine distributed in said chewing gum base is in the range of about 1 to about 10 milligrams, such amount of nicotine approximating the amount available upon smoking a smoking tobacco product;

E. the nicotine being present in said gum composition as a nicotine compound selected from the group consisting of
   a. a nicotine free base,
   b. a pharmacologically-acceptable salt of nicotine, and
   c. a nicotine-regenerative adsorbent complex comprising a compound selected from the group consisting of nicotine and a pharmacologically-acceptable salt of nicotine sorbed on a regenerative adsorbent;

F. said chewing gum composition when chewed releasing nicotine in small and reduced amounts within a period of the first few minutes of chewing, and

G. especially within the first ten minutes of chewing releasing the nicotine at a rate less than if the nicotine were present in an ordinary chewing gum composition, having a relatively low percentage of chewing gum base, that is, an amount constituting less than about 40 percent by weight of the gum composition.

3,877,469
CONDITIONING OF TOBACCO

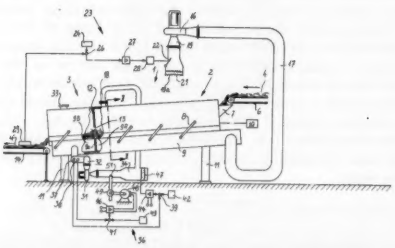
Waldemar Wochnowski; Uwe Leckband; Hans-Heinrich Barth, and Reinhard Hohm, all of Hamburg, Germany, assignors to Hauni-Werke Korber & Co. KG, Hamburg-Bergedorf, Germany

Filed Oct. 18, 1972, Ser. No. 297,868

Claims priority, application Germany, Oct. 19, 1972, 2151844; Mar. 11, 1972, 2211879

Int. Cl. A24b *09/00*

U.S. Cl. 131—136 **11 Claims**



1. Apparatus for conditioning tobacco, comprising conveyor means for transporting a continuous stream of tobacco particles along a predetermined support path, said conveyor means including a casing having a bottom wall constituting a tobacco supporting member and being provided with a plurality of apertures, said conveyor means transporting the tobacco stream so that the particles of tobacco are carried by said supporting member; means for passing currents of a gaseous conditioning fluid through the apertures of said supporting member and across said support path, while the tobacco is disposed on said supporting member, so that the fluid exchanges energy with tobacco particles on said supporting member; and means for pulsating said currents, including means for moving said supporting member, said casing further comprising side walls flanking said support path, said side walls extending upwardly beyond the tobacco stream on said supporting member and diverging upwardly and away from said support path so as to allow for expansion of gaseous fluid subsequent to passage of said currents across said support path, said supporting member functioning further to convey tobacco away from said casing.

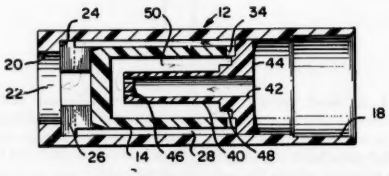
3,877,470
SMOKER'S FILTER DEVICE

Warren R. Jewett, Orange, and William H. Mason, Woodbridge, both of Conn., assignors to Bio-Gant Corporation, Woodbridge, Conn.

Filed May 2, 1974, Ser. No. 466,407

Int. Cl. A24d *07/04*

U.S. Cl. 131—261 B **5 Claims**



1. A smoker's filtering device for tar removal incorporating an impact barrier and a labyrinthine smoke channel, comprising in combination:

an outer tubular sleeve having open opposite inlet and outlet ends for the passage of smoke therethrough, and having an internal annular shoulder at said outlet end;

an inner tubular sleeve telescopically received in said outer sleeve, said inner sleeve being open at one end and closed adjacent the other, an external annular flange at the closed end, each of said ends of said inner sleeve being castellated and one end thereof having a portion extending axially beyond the outlet end and radially beyond the external wall of the sleeve, the castellation in said flange comprising means providing a plurality of radially extending slots therein whereby said external flange is interrupted peripherally by the castellation at that end, said external flange being in axial abutment with said internal shoulder of said outer sleeve whereby the body of said inner sleeve is disposed in annularly spaced relation to said outer sleeve to define a first annular passage extending axially in said device and whereby the closed end of the inner sleeve body is spaced from said internal annular shoulder toward the inlet end thereof thereby providing a plurality of radially extending smoke passages through said slot means; and

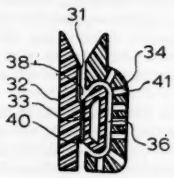
an orifice tube comprising a T-shaped plug having a headed end and a hollow stem opening onto the headed end but closed at the distal end, means providing at least one axially directed restricting orifice in said distal end of the stem, said plug being telescopically received within said inner sleeve, the headed end of said plug making a piston fit in said outer sleeve and abutting the open end of said inner sleeve to close the latter, said stem being of such length as to position said distal end in close axially spaced relation to the closed end of said inner sleeve and provide an impact barrier for smoke issuing from said orifice tube, said stem being smaller in diameter than said inner sleeve to form a second annular axially directed passage encircled by the first but separated therefrom by said inner sleeve except at the castellated end thereof;

said inlet and outlet ends of said filter device being sequentially intercommunicated by said hollow stem, orifice, annular passages and castellated formations at the ends of

said inner sleeve, to form said labyrinthine smoke channel.

3,877,471
PROCESS AND APPARATUS FOR TREATING HUMAN HAIR

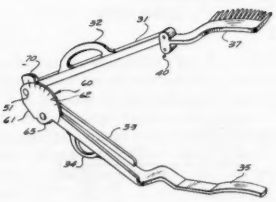
Flavil Boyd, 999 N. Lake Shore Dr., Chicago, Ill. 60611
Filed Mar. 13, 1974, Ser. No. 450,659
Int. Cl. A45d *1/00*
U.S. Cl. 132—9 **4 Claims**



1. A hair crimping device comprising an elongated base member adapted to be disposed along one lateral edge in close association with the scalp, an elongated bead member on one face of said base member, said bead member having a cross-sectional configuration such that the surface of said bead member immediately adjacent the conjunction of said bead member with said base member is disposed at an acute angle to said face of said base member and a resilient clamping member having an elongated opening therein, said clamping member having a cross-sectional configuration complimentary to the cross-sectional configuration of said bead member and sufficiently distortable that said clamping member can be forced over and into interfitting, clamping relation with said bead member, with strands of hair disposed therebetween.

3,877,472
HAIR STYLING DEVICE

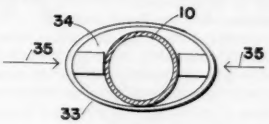
Frank D'Angelo, 5158 Mt. Whitney, Marrero, La. 70072
Filed Apr. 8, 1974, Ser. No. 458,499
Int. Cl. A45d *24/38*
U.S. Cl. 132—145 **4 Claims**



1. Hair styling means comprising in combination:
a. elongated inner handle means having an extended guide portion;
b. elongated outer handle means pivotally connected to said inner handle means; and
c. comb means having a plurality of teeth pivotally connected to said outer handle means such that both of said means are disposed in an essentially horizontal plane when the teeth of said comb means are vertically oriented, said comb means being further defined as comprising comb positioning means whereby said comb means is maintained in an essentially parallel relationship with the guide portion of said inner handle means.

3,877,473
BINGO TYPE CHIP DISPENSER

Leslie Williams, 627 St. Mary's Rd., Winnipeg, Manitoba, Canada
Filed Sept. 10, 1973, Ser. No. 395,831
Int. Cl. G07d *1/00*
U.S. Cl. 133—5 A **1 Claim**



1. A storage container and dispenser for disc-like chips used for bingo and the like, comprising a cylindrical casing having an open base, and adapted to hold a plurality of said chips in stacked relationship therein, means adjacent the open base restraining the chips from discharge through said base and manipulative means exteriorly of said cylindrical casing engageable through apertures in the wall of said case, to urge the lowermost chip past the means for restraining the chips from discharge, said means exteriorly of said cylindrical casing comprising a flexible, substantially oval band freely surrounding said casing, and a plurality of inturned wedge shaped inwardly facing portions on the inner surface of said band engageable within said apertures and adapted to separate the lowermost chip from the chips superadjacent thereto within said casing, and to discharge said lowermost chip past said means for restraining said chips from discharge.

3,877,474
METHOD FOR RECLAIMING INSULATED WIRE UTILIZING AGITATION OF A CHLORINATED HYDROCARBON BATH

Allen H. Urssing, Sepulveda; William R. Despain, Los Angeles, and Henry John Ramos, Hollywood, all of Calif., assignors to R&D Metals, Los Angeles, Calif.
Filed Aug. 4, 1972, Ser. No. 277,991
Int. Cl. B08b *3/10*
U.S. Cl. 134—6 **10 Claims**

1. A method for reclaiming the metallic conducting wire from bales of tangled strands of insulated wire and cable comprising the steps of:
a. immersing said bales into a bath of a chlorinated hydrocarbon contained in a sealable tank, said tank being mechanically coupled to a source of power capable of agitating said tank;
b. sealing said tank;
c. heating said chlorinated hydrocarbon to its boiling point;
d. concurrent with said heating step, energizing said power source so as to cause said tank and said bales therein to be agitated until said insulating material is separated from said wire;
e. de-energizing said power source and removing said wire from said tank; and
f. recovering said chlorinated hydrocarbon from said tank by the distillation thereof.

3,877,475
SAFE LIGHTING GAS VALVE

Paul Dietiker, Redondo-Beach, Calif., assignor to Honeywell Inc., Minneapolis, Minn.
Filed Oct. 17, 1973, Ser. No. 407,369
Int. Cl. F23n *5/10*
U.S. Cl. 137—66 **5 Claims**

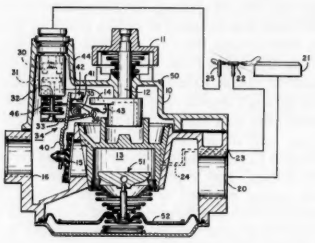
1. A gas control comprising:
a housing having an inlet and an outlet,
a manually operable control means having a rotary and axially movable shaft for controlling the flow of gas between said inlet and said outlet,

a safety valve for stopping the flow of gas from said inlet to said outlet,

an electromagnet adapted to be energized by the heating of a thermocouple by a flame produced by gas flow through said safety valve,

an armature movably associated with said electromagnet and to be held in one position when said electromagnet is energized by the presence of a flame and to drop to a second position when the flame goes out,

lever means operably connecting said safety valve and said armature to hold said safety valve open when said armature is held in said one position, said lever means having a latching means which upon being unlatched said safety valve can close even though said armature remains in said one position,



means connecting said manual control means to said lever means to move said armature against said electromagnet when said control means is moved axially to open said safety valve, and

means associated with said manually operable control means for unlatching said latching means when said manual control means is rotated to a position to terminate or nearly terminate the gas flow whereby said safety valve closes even though said electromagnet is still energized by a hot thermocouple, said latching means relatching when said armature returns to said second position upon said electromagnet being de-energized and said manually operably control means being moved from said unlatching position.

3,877,476

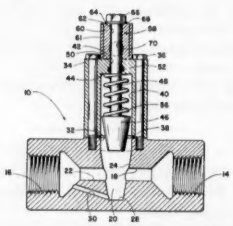
HEAT ACTUATED VALVE

Kenneth N. Mills, Tulsa, Okla., assignor to Kenco Engineering Company, Tulsa, Okla.

Filed Aug. 22, 1973, Ser. No. 390,604

Int. Cl. F16k *17/40*

U.S. Cl. 137—75 **5 Claims**



1. A heat actuated valve comprising a valve body having a fluid passageway extending therethrough, valve seat means provided in the body in communication with the fluid passageway means, valve closure means mounted in the valve body and movable transversely with respect to the fluid passageway, spring means engagable with the closure means for constantly urging the closure member in a direction toward the valve seat, heat responsive means secured to the valve closure means for retaining the closure means against the force of the spring to provide a normally open position for the valve, said heat responsive means being constructed from a eutectic material responsive to preselected excessive ambient temperatures for flowing and releasing the closure means whereby the spring means moves the closure means into seating engagement with the valve seat means to provide a closed position for the valve, retaining means cooperating with the heat responsive means for precluding cold flowing thereof at temperatures lower than the preselected temperature to preclude premature closing or partial closing of the valve; and

wherein the closure means comprises a valve stem having a gate member carried thereby, and the heat responsive means comprises a sleeve member of eutectic material receiving the valve stem therethrough, and including stop means secured to the outer extremity of the valve stem for engaging the eutectic sleeve to retain the closure member against the force of the spring to provide said normal open position for the valve; and

wherein the retaining means comprises a sleeve constructed of a material having a higher melting point than the eutectic sleeve and disposed around the outer periphery thereof for precluding said cold flowing of the eutectic sleeve to maintain the eutectic sleeve in the normal configuration thereof at temperatures lower than the preselected temperatures for precluding premature closing or partial closing of the valve; and

wherein the retaining sleeve includes aperture means providing for flow of the eutectic material from the interior of the retaining sleeve upon excessive ambient temperatures; and

wherein said eutectic sleeve and said retaining sleeve comprise a unitary assembly separate from said valve, and in abutting contact therewith the interior surface of said retaining sleeve being in intimate contact with the outer surface of said eutectic sleeve to prevent cold flow of the material of said eutectic sleeve.

3,877,477

PNEUMATIC TWO-POSITION CONTROLLER

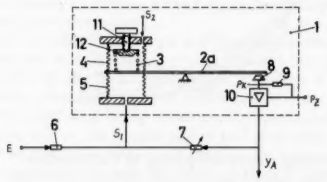
Horst Bader, Stuttgart-Fasanenhof, Germany, assignor to J. C. Eckardt AG, Stuttgart, Germany

Filed Aug. 13, 1971, Ser. No. 171,634

Claims priority, application Germany, Aug. 13, 1970, 2040170The portion of the term of this patent subsequent to Aug. 14, 1990, has been disclaimed.

Int. Cl. G05d *16/00*

U.S. Cl. 137—82 **7 Claims**



1. A fluid-pressure operated two-position controller using a differential pressure amplifier operating with a source of supply pressure and providing an output pressure of first and second values in dependence upon a variable input pressure value reaching first and second set point values, comprising: first and second pressure chambers defined by elastic walls, said first chamber being supplied with a first control pressure of a predetermined value and said second chamber being supplied with a second control pressure,

actuator means connected to the elastic walls of said first and second pressure chambers so as to be displaced in response to the differential pressure in said chambers for regulating the magnitude of said supply pressure to produce the output pressure of first and second values,

spring means for biasing said actuator means in the same direction as one of said first and second pressure chambers, and

pressure distributor means for providing said second pressure including a pair of fluid throttle resistors connected in series between an input pressure source providing an input pressure of variable value and said output pressure, said second pressure being derived from a point between said pair of fluid throttle resistors.

3,877,478
FLUID FLOW CONTROL VALVES

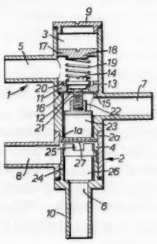
Alfred Longworth, Wembley, England, assignor to Radiation Limited, London, England

Filed Sept. 5, 1973, Ser. No. 394,417

Claims priority, application United Kingdom, Sept. 11, 1972, 42103/72

Int. Cl. F16k *31/08*

U.S. Cl. 137—94 **14 Claims**



1. Apparatus for controlling the flow of one fluid in dependence upon the flow of another fluid comprising

1. a first housing of non-magnetic material having a flow path therethrough for the one fluid,
2. a second housing of non-magnetic material having a flow path therethrough for the second fluid, in non-communicating relationship with the first mentioned flow path,
3. fluid flow control means in the flow path in the first housing for controlling fluid flow along that path,
4. flow responsive means in the flow path in the second housing movable therein in response to flow along that path,
5. first and second permanent magnet means forming part of the flow control means and the flow responsive means respectively,
6. weir means in the flow path through the second housing and in which said flow responsive means is located, said weir means acting to ensure a predetermined movement of said flow responsive means, and,
7. said housing being in close proximity whereby said predetermined movement of said flow responsive means operates said fluid flow control means.

3,877,479
STEAM TRAP

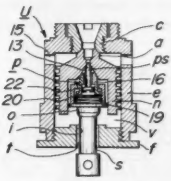
Sentaro Miyawaki, 26-32, 3-chome, Nishi, Senriyama, Suita Osaka-fu, Japan

Continuation-in-part of Ser. No. 170,907, Aug. 11, 1971, abandoned. This application July 26, 1973, Ser. No. 383,016

Claims priority, application Japan, Aug. 15, 1970, 45-71616

Int. Cl. F16t *1/30*

U.S. Cl. 137—185 **3 Claims**



1. In a bell-float type stream trap with a double-action trapping unit having a casing with a cover including a partition wall; a bell float disposed in the casing so as to receive fluid; a trapping unit secured to said cover, said trapping unit including a guide cylinder depending from the cover partition wall, a hollow piston having a central passage and being slidably disposed in the guide cylinder, a main valve seat arranged coaxially with the guide cylinder, said main valve seat having a drain valve port coaxially therethrough, the diameter of said drain valve port being not smaller than three times the diameter of said central passage of the hollow piston, said hollow piston acting as a drain valve engageable with said main valve seat, a gland bush secured to the lower end of the guide cylinder so as to define a pressure chamber between the gland bush and the piston, a pilot valve closingly engageable with said central passage of the piston from the pressure chamber, a valve stem extending through said gland bush for connecting said pilot valve to said bell float, the pressure in the pressure chamber being switched between internal pressure of the casing and outlet pressure in response to the action of said pilot valve, said guide cylinder having at least one opening at the upper end thereof through which the internal pressure of the casing acts on an upper surface of said piston and through which condensate is drained when the drain valve port is opened; the improvement comprising:

a. a concave conical surface on one end of said central passage of the piston, wherein the smaller diameter of said conical surface is adjacent to one end of said central passage of the hollow piston; and

b. a convex conical top end on said pilot valve engageable with said concave conical surface, said conical top end being separated into an impact portion and a valve portion by an annular groove about said conical top, said impact portion having at least one pressure passage groove on its outer surface.

3,877,480
NOZZLE VALVE ASSEMBLY

James L. Hughes, and James E. Lawrence, both of Cincinnati, Ohio, assignors to Dover Corporation, Cincinnati, Ohio

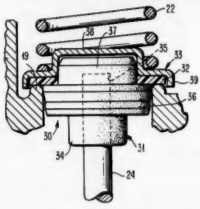
Continuation of Ser. No. 125,263, March 17, 1971, abandoned. This application Jan. 11, 1973, Ser. No. 322,886

Int. Cl. F16k *25/00*

U.S. Cl. 137—329.06 **1 Claim**

1. In a gasoline dispensing nozzle having a passage, a valve seat within the passage, a poppet valve to control flow through said passage and cooperating with said seat to stop flow through said passage, an actuating stem engaging said poppet valve to move said poppet valve away from said seat to allow flow through said passage, and a spring acting on said poppet valve to urge said poppet valve against said seat, said poppet

valve including a heat destructible skirt, said skirt including a flow control portion shaped to cooperate with the flow passage to regulate the quantity of flow past said poppet valve, and an upper guide portion, said upper guide portion having a diameter width substantially greater than the guide portion axial length, a heat destructible sealing disc mounted on said upper guide portion and being axially movable thereon, said guide portion positioning said sealing disc relative to said seat, said sealing disc engaging said seat to stop flow through said passage, and a member mounted over said skirt upper guide portion and disposed to have one end of said spring acting thereagainst, said member having a centrally disposed boss to

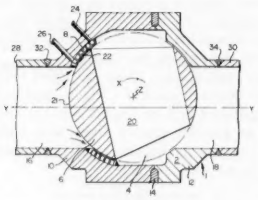


cooperatively receive said skirt upper guide portion, said spring having a width greater than said member boss wherein said one end of said spring is disposed thereover so that said boss is a guide for said spring; said sealing disc being disposed between said skirt and said member, said upper guide portion associated between said skirt and said member axially aligning said skirt and said member, said skirt being free to move axially with respect to said member and said disc when said disc is in sealing engagement with said seat, and said member having a periphery larger than the periphery of said seat wherein said member will engage said seat to stop flow through said passage in the event of disc and skirt destruction.

3,877,481
VALVE ASSEMBLY

Frederick L. Sharp, and Valentino S. Cecco, both of Deep River, Ontario, Canada, assignors to Atomic Energy of Canada Limited, Ottawa, Ontario, Canada

Filed Apr. 30, 1973, Ser. No. 355,414
Claims priority, application Canada, July 26, 1972, 147991
Int. Cl. F16k *5/06, 49/00*
U.S. Cl. 137—340 **1 Claim**

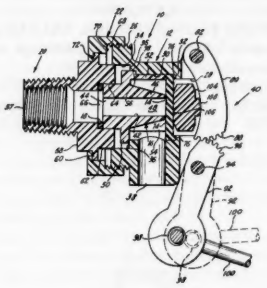


1. A valve assembly, comprising a casing having a fluid passage with an inlet portion and an outlet portion, a valve closure member mounted in the casing for closing the fluid passage therein, a heat exchange conduit in the casing and around a portion of the casing fluid passage adjacent an upstream side of the valve closure member, for freezing fluid as a leak-proof seal and lock between the closure member and the casing when the closure member is in the closed position, and actuating means for moving the closure member between the open and closed positions, and wherein the improvement comprises the valve closure member is a valve ball having a fluid passage off-center in a direction away from and downstream of a sealing surface thereof when the valve ball is in the closed position, and the valve ball is rotatably mounted in the casing about an axis which is off-center in a transverse direction with respect to the longitudinal axis of the inlet and outlet portions of the fluid passage, to align the valve ball fluid passage with the casing fluid passage when the valve ball is in the open position, and to position the fluid passage sealing surface adjacent the heat exchange conduit when the valve ball is in the closed position.

3,877,482
FLOAT VALVE

Daniel J. Rawdon, New Hartford, Iowa, assignor to Hawkeye Steel Products, Inc., Waterloo, Iowa

Filed Oct. 17, 1973, Ser. No. 409,273
Int. Cl. F16k *31/26*
U.S. Cl. 137—446 **6 Claims**



1. A float valve comprising:

a housing having a through bore defining a first pressure plug chamber at one end, a second central water chamber with a discharge port perpendicular to said bore and a third inlet chamber at the opposite end,

said central chamber being of a larger diameter than said first chamber defined by a first shoulder intermediate the same and said third chamber being larger in diameter than said central chamber defined by a second shoulder intermediate the same,

a flexible disc-shaped diaphragm in said central chamber seated on said first shoulder so as to close flow communication between said first and second chambers,

an orifice plug having a body portion provided with a through bore defining an inlet end and an outlet end and an external flange on said body portion intermediate said ends,

said orifice plug being journalled in said housing so that said outlet end is disposed within said central chamber in contact with said diaphragm and said flange is abutted against said second shoulder with said inlet end axially aligned with said third chamber,

means on said orifice plug separate from said outlet end for engagement with said diaphragm to prevent the displacement of said diaphragm from its seated position,

means to secure said housing to a source of water supply,

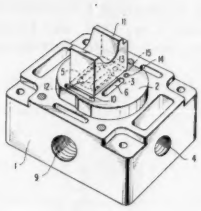
a separate pressure plug member removably disposed in said first chamber in juxtaposition with said diaphragm and oppositely disposed to the outlet end of said orifice plug so as to be capable of impressing said diaphragm into water sealing engagement with said outlet end, and

float actuated lever means operatively attached to said housing and movable into and out of engagement with said pressure plug whereby the respective upward and downward movement of said float acts on said lever means to respectively impart a pressure engagement therewith with said pressure plug against said diaphragm to define the close valving position of said diaphragm and to relax the pressure engagement with said pressure plug relative to said diaphragm to define the open valving position of said diaphragm.

3,877,483
SOLENOID OPERATED FOUR PORT VALVE

Hiroyuki Nakajima, Ashiya, Japan, assignor to Konan Electric Co., Ltd., Nishinomiya-shi, Hyogo, Japan

Filed May 10, 1974, Ser. No. 468,720
Int. Cl. F15b *13/043*
U.S. Cl. 137—625.64 8 Claims



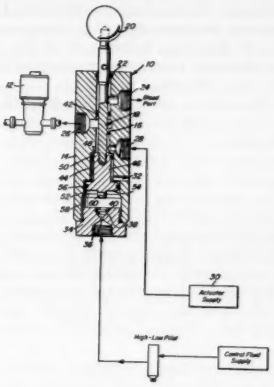
1. In a solenoid operated four port valve comprising a piston operable in the main body of the four port valve, a fixed valve seat member, a slidable valve member operated by the piston and movable between first and second positions for connecting an inlet port and an exhaust port through said valve seat member to either of outlet ports A and B, respectively, and a solenoid operated three port pilot valve for controlling a pressurized fluid supplied through the inlet port to a chamber on one side of the piston; the improvement comprising a small groove provided in the slidable valve member in communication with a recessed portion formed therein, a first pilot hole and a second pilot hole extending through a valve seat member for supplying a part of the pressurized fluid to a chamber on the opposite side of the piston under a transferring action of the small groove and an edge of the slidable valve member, the relative positions and the dimensions of the small groove, the first and the second pilot holes, and the edge of the slidable valve member being so selected that the transferring action occurs in a later part of the time period during which the connection of the inlet port and the exhaust port is changed between the two outlet ports A and B.

3,877,484
PNEUMATIC RELAY

Gerold F. Theriot, Bourg, and Frank M. Hoofnagle, Houma, both of La., assignors to B. W. B. Controls, Inc., Houma, La.

Filed Sept. 6, 1973, Ser. No. 394,849
Int. Cl. F16k *17/00*
U.S. Cl. 137—625.66 13 Claims

1. A valve comprising a valve body, an elongated bore within said body, a first fluid inlet port, an outlet port, a bleed port, a second fluid inlet port, a valve member slidable within said bore, said valve member presenting a first pressure surface on said valve member exposed to said first fluid inlet port, a second pressure surface on said valve member exposed to said second fluid inlet port, said valve being selectively shiftable between a first position allowing communication between the first fluid inlet port and the outlet port and precluding communication between the outlet port and the bleed port, and a second position allowing communication between said outlet port and said bleed port and precluding communication between said first fluid inlet port and said outlet port, a greater total force on said second pressure surface than on said first pressure surface maintaining said valve member in said first position, a greater total force on said first pressure surface than on said second pressure surface moving said valve to said second position, and means for effectively precluiding fluid pressure supplied said valve through said second fluid inlet port from moving said valve from said second position to said first position, said precluding means including a) an exhaust port in fluid communication with said second fluid inlet port only when said valve member is in a further position intermediate said first and second positions, and b) seal means preventing fluid communication between said exhaust port and

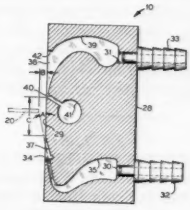


said second fluid inlet port when said valve member is in said first and second positions.

3,877,485
FLUIDIC SENSOR

Richard J. Wojcikowski, Toledo, Ohio, assignor to Dana Corporation, Toledo, Ohio

Filed June 15, 1973, Ser. No. 370,274
Int. Cl. F15c *1/10*
U.S. Cl. 137—829 6 Claims



1. A fluidic sensor comprising:
a. a sensor body having a fluid inlet port, a fluid outlet port and a generally planar external face;
b. an emitter port in communication with said inlet port, said emitter port being defined within the body adjacent the planar face and oriented so as to discharge fluid at an acute angle outwardly from said planar face;
c. a receiver port in communication with said outlet port and said planar face, said receiver port being spaced along said planar face from said emitter port in a direction, generally corresponding to the discharge from said emitter port;
d. a recess in said planar face adjacent said emitter
e. e. a pressure drop chamber in said body in communication with said planar face between said emitter and receiver ports and adjacent said receiver port; and
f. a cusp in said receiver port on the side thereof opposite said emitter port and adjacent said planar face, said emitter port, receiver port, pressure drop chamber and cusp being positioned with respect to said planar face to normally guide a portion of the fluid flow from said emitter

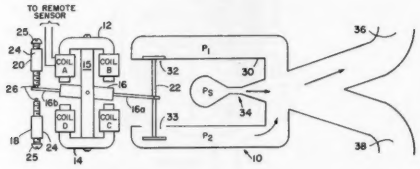
port into the receiver port in the absence of an external interference

3,877,486

ELECTRICAL-TO-FLUIDIC INTERFACE DEVICE

Jimmy D. Merrell, Madison; Samuel J. Spurgeon, Jr., Huntsville, and J. C. Dunaway, Falkville, all of Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 1, 1973, Ser. No. 402,546
Int. Cl. F15c *1/04*
U.S. Cl. 137—831 2 Claims



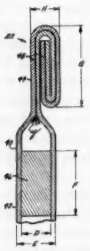
1. An electrical-to-fluidic interface device for rapidly switching a constant fluidic supply pressure between opposing output ports and comprising: a fluidic amplifier having first and second output ports and first and second control ports; a fluidic power source for providing a constant steady state supply pressure thereto; first and second poppet valves disposed within said amplifier control ports for simultaneously opening and closing respective ports and having a common stem externally coupled therebetween; electromagnetic means coupled to said common valve stem for alternately opening and closing said control ports, said electromagnetic means being a coil assembly supported on first and second iron cores and an elongated armature assembly disposed for limited, bidirectional rotation between said cores in response to electrical stimulation of said coil assembly; a first end of said elongated armature being coupled to said valve stem for simultaneously opening one control port while closing the other; and flexible, resilient stopping means disposed adjacent said electromagnetic means in the plane of rotation of said armature for terminating bidirectional rotation of the armature prior to impact of the armature with the coil assembly.

3,877,487

CONTROLLED FLOW PATTERN VENT STRUCTURE

Joseph C. McGuire, Kennewick, Wash., assignor to McDonnell Douglas Corporation, Santa Monica, Calif.

Division of Ser. No. 376,527, July 5, 1973, Pat. No. 3,803,816.
This application Feb. 26, 1974, Ser. No. 445,888
Int. Cl. F15d *1/00*
U.S. Cl. 138—42 4 Claims



1. A vent structure comprising:

a tubing of predetermined length and size, said tubing including an undeformed normally lower portion and a formed normally upper portion, and said upper tubing portion being flattened and folded against itself; and

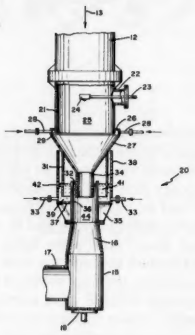
a layer of predetermined thickness of compacted yarn in said upper tubing portion separating its opposing proximate faces and preventing them from sintering together.

3,877,488

VENTURI SCRUBBER EXPANSION JOINT

Allen Baturay, Foster City, Calif., and Harold W. Richards, Westport, Conn., assignors to Dorr-Oliver Incorporated, Stamford, Conn.

Filed Jan. 2, 1973, Ser. No. 320,434
Int. Cl. F15d *1/02*
U.S. Cl. 138—44 4 Claims



1. A water-seal expansion joint in a vertically oriented venturi scrubber, said scrubber having an upper convergent inlet section and a lower divergent outlet section and a throat region therebetween, the said sections having cooperating cylindrical throat elements which overlap in said throat region but are not in contact, said inlet section having a weir sealed thereto and in spaced surrounding relation to said inlet throat element, said outlet throat element surrounding and spaced from said inlet throat element and positioned between said inlet throat element and said weir, an annular sealing channel located about the end of said outlet throat element and defined by an outer sealing wall, said outlet throat element and a bottom wall, said outer sealing wall being generally concentric with said weir, said weir extending into the channel short of said bottom wall to divide said annular channel into an inner compartment in communication with said venturi throat region and an outer compartment which is exposed to atmospheric pressure, the said compartments being in fluid communication.

3,877,489

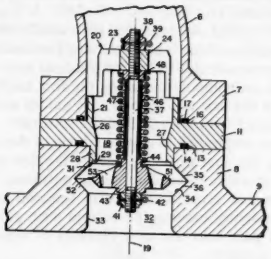
SPEED LIMITING VALVE

Albert Louie, San Leandro; Willard D. Childs, Moraga, and A. Bruce Duncan, Piedmont, all of Calif., assignors to The Rucker Company, Oakland, Calif.

Filed Sept. 4, 1973, Ser. No. 394,380
Int. Cl. F15d *1/00*
U.S. Cl. 138—46 4 Claims

1. A surge flow speed limiting valve for use in hydraulic equipment comprising a hydraulic line having a valve plate, the valve plate being formed with an opening therethrough for allowing bi-directional line flow, means forming cage means on and projecting from one side of said plate surrounding said opening, means forming a valve seat on the other side of said plate surrounding said opening, a stationary valve stem mounted on said cage means and extending through said opening, a valve disk having at least one opening slidably mounted on said stem and movable thereon between a first position in abutment with said seat and a second position

spaced away from said seat, spring means surrounding said stem and abutting said cage means and said valve disk resiliently pressing the valve disk toward said second position,



means for stopping said valve disk in said second position, and means forming flow passages through said valve disk for allowing flow through the opening in the valve disk when in said second position.

3,877,490

STEEL PIPES PROVIDED WITH PLASTIC COATINGS

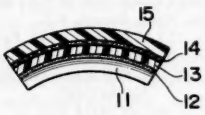
Yoshio Tsubouchi, Yokohama; Noboru Shima, Kawasaki, and Hiroyuki Tanabe, Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed June 8, 1973, Ser. No. 368,127

Claims priority, application Japan, July 25, 1972, 47-73852

Int. Cl. F16l *9/14*

U.S. Cl. 138—141 **3 Claims**



1. In a steel pipe provided with a corrosion resistant layer of plastic and a protective layer of plastic applied onto said corrosion resistant layer through an intermediate coextensive layer of an antifusion agent, the improvement wherein said antifusion agent comprises a mixture of two or more of synthetic resins of the polyolefin series, said mixture of synthetic resins having lower molecular weight than said plastics forming said corrosion resistant layer and said protective layer and solidifying at room temperature to form a film whereby fusion and slippage between the layers of plastic is prevented.

3,877,491

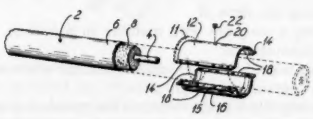
INSULATED PIPE SYSTEMS

Ove Thastrup, Fredericia, Denmark, assignor to A/S E. Ramussen, Fredericia, Denmark

Continuation of Ser. No. 21,027, March 19, 1970, abandoned. This application Feb. 4, 1972, Ser. No. 223,676

Int. Cl. F16l *59/14*

U.S. Cl. 138—149 **38 Claims**



1. A heat insulated pipe system comprising: a plurality of insulated pipe units; each pipe unit including an axially rigid interior conductor tube, an exterior protective mantel tube of relatively rigid synthetic material, and a heat insulating material interposed between said interior and exterior tubes; each of said conductor tubes having an end portion extending beyond the end of the corresponding exterior tube of the respective pipe unit, the end portion of one conductor tube being axially rigidly joined with the end portion of another conductor tube to form a conductor tube joint, tube casing means for bridging the conductor tube joint and overlapping adjacent end portions of the exterior tubes, and clamping means for rigidly and sealingly clamping said tube casing means around the end portions of the exterior tubes, wherein said interior tubes, exterior tubes, tube casing means, and clamping means are constructed such that axial movement of the interior tubes with respect to one another and axial movement of the exterior tubes with respect to one another is substantially precluded with a consequent substantial limitation of axial movement of the interior tubes with respect to the exterior tubes at least in the area of said conductor tube joints during use of this system with temperature changes induced by a fluid medium flowing through said conductor tubes at a different temperature than the medium surronding the exterior tubes.

3,877,492

TERRY MOTION FOR LOOMS

Howard I. Nelson, Grafton, Mass., assignor to Crompton & Knowles Corporation, New York, N.Y.

Filed Oct. 23, 1973, Ser. No. 408,702

Int. Cl. D03d *39/22*

U.S. Cl. 139—26 **12 Claims**

1. In a terry loom having a frame and weft inserting means, beat-up means comprising:

a. a lay pivotally mounted to said frame about a stationary axis;

b. a lay drive assembly for reciprocating said lay about said axis;

c. means for movably mounting said lay drive assembly on said frame for altering the beat-up position of the lay; and

d. actuating means for moving said lay drive assembly to a first position for a full beat-up and to a second position for a partial beat-up.

3,877,493

ELECTRICAL FILLING STOP MOTION

Jerry R. Cleveland, 112 Corning St., Anderson, S.C. 29621

Filed July 16, 1973, Ser. No. 379,613

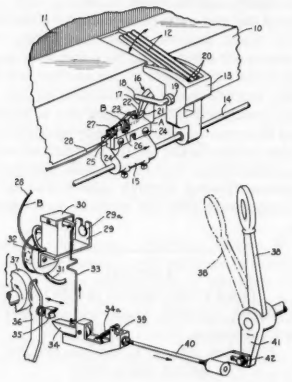
Int. Cl. D03d *51/36*

U.S. Cl. 139—374 **1 Claim**

1. A filling stop motion for a loom having a center-fork assembly with pivoted yarn feeler prongs, a cam, a cam follower moved responsive to movement of said prongs in the absence of filling yarn into a notch in said cam, and a knock-off motion with a magnet assembly normally electrically actuated by the drop wires of the warp stop motion responsive to faulty warp yarn to actuate linkage for moving the shipper handle mechanism to stop the loom, said filling stop motion comprising:

an electrical contact imbedded in the base of the notch of said cam to form an exposed camming surface,

said camming surface being engaged by said cam follower for maintaining electrical contact therewith during movement of the cam follower in response to downward movement of said prongs, said camming surface extending downwardly and thence upwardly so as to limit further rearward movement of the cam follower; and



electrical means including a conductor imbedded in said cam connecting said electrical contact to said magnet assembly and said cam follower for actuating said magnet assembly to actuate said linkage to stop the loom in the absence of filling yarn;

whereby said electrical contact between said camming surface and said cam follower is maintained for sufficient time to permit such actuation of said linkage.

3,877,494

APPARATUS FOR DEFINING A VARIABLE CONDUCTIVE PATTERN SUITABLE FOR THREADING THROUGH THE ELEMENTS OF A DIGITAL MEMORY

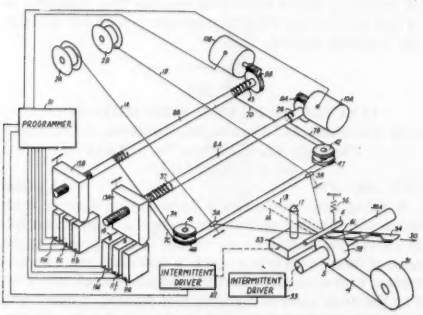
Milos Masek, and Josef Mohelnicky, both of Prague Czechoslovakia, assignors to Vyzkumny ustav matematickych stroju, Prague, Czechoslovakia

Filed Apr. 10, 1972, Ser. No. 242,818

Claims priority, application Czechoslovakia, Apr. 13, 1971, 2611-71

Int. Cl. B21f *45/00*

U.S. Cl. 140—71 R **7 Claims**



1. For use in the manufacture of a digital memory, apparatus responsive to a sequence of selected commands for producing, from first and second wires, a predetermined plurality of wire patterns mounted on a substrate, which patterns are representative of conductive paths through the elements of the digital memory, said apparatus comprising:

means supporting the substrate for movement along a longitudinal axis;

first and second wire guides individually supported for reciprocal movement along parallel first and second paths each perpendicular to the longitudinal axis;

means for individually threading the first and second wires through the first and second wire guides and into adherent contact with a surface of the substrate;

first means responsive to a selected one of the command for moving the first wire guide along the first path into one of the plurality of predetermined positions;

second means responsive to said selected command for independently moving the second wire guide along the second path into one of a plurality of similar predetermined positions;

first and second means individually operative when the first and second wire guides reach their respectively selected positions for disabling the associated moving means; and

means rendered effective at the conclusion of each operation of the first and second disabling means for longitudinally advancing the substrate by a predetermined increment to define separate portions of the pattern on the substrate.

3,877,495

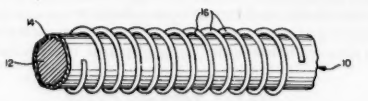
METHOD OF MANUFACTURING IMPROVED FILAMENTS FOR FLUORESCENT LAMPS

Ronald C. Koo, Weehawken, and Joel Shurgan, Washington Township, Bergen County, both of N.J., assignors to Duro-Test Corporation, North Bergen, N.J.

Division of Ser. No. 223,607, Feb. 4, 1972, Pat. No. 3,812,393, which is a continuation-in-part of Ser. No. 66,275, Aug. 24, 1970, Pat. No. 3,662,789. This application Mar. 4, 1974, Ser. No. 447,481

Int. Cl. B21f *3/04*

U.S. Cl. 140—71.5 **6 Claims**



1. A method of forming a filament for an electric lamp comprising the steps of

winding a tungsten wire member in a coil on a mandrel containing iron,

coating one of the wire and mandrel members with a coating containing copper,

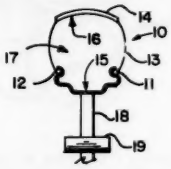
annealing the tungsten wire on the mandrel at an elevated temperature to melt the coating for a period of time such that no significant amount of impurities diffuse into the wire, and

removing the mandrel from the coil.

3,877,496
PNEUMATIC TIRE INFLATING AGENTS

Lawrence R. Sperberg, 6740 Fiesta Dr., El Paso, Tex. 79912

Continuation of Ser. No. 253,904, May 16, 1972, abandoned, which is a continuation of Ser. No. 104,639, Jan. 7, 1971, abandoned, which is a continuation-in-part of Ser. No. 814,233, April 4, 1969, Pat. No. 3,554,027, which is a continuation of Ser. No. 601,275, Nov. 21, 1966, abandoned.
This application June 26, 1973, Ser. No. 373,643
Int. Cl. B65b *31/00*
U.S. Cl. 141—4 **11 Claims**



1. Method of improving the durable life of a pneumatic tire for use on an earth bound vehicle comprising the steps of:

mounting the pneumatic tire on a wheel, adding to the tire chamber of the pneumatic tire a gaseous inflating agent; said agent being a mixture of at least two different gases, one gas being selected from a first group of gaseous compounds, and the secong gas being selected from a second group of gaseous compounds;

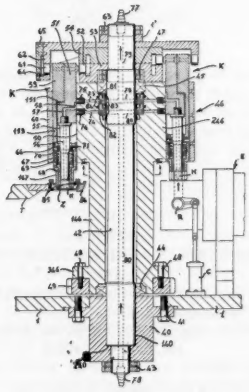
said first group consisting essentially of hydrogen and helium:

said second group consisting essentially of nitrogen, carbon dioxide, flue gases, and air.

3,877,497
MACHINE FOR THE DEPOSITION OF MEASURED AMOUNTS OF SOFTENED THERMOPLASTIC MATERIAL INTO CLOSURE CAPS

Ettore Busi, 191 Via Selice, Imola, Italy (40026)

Filed Sept. 4, 1973, Ser. No. 393,778
Claims priority, application Italy, Sept. 8, 1972, 12882/72
Int. Cl. B65b *43/42*
U.S. Cl. 141—138 **9 Claims**



1. A machine for inserting measured amounts of molten thermoplastic material into closure caps, comprising:

a. an extrusion device provided with a delivery outlet for a continuous flow of viscous or softened plastic material;

b. at least one gripper unit mounted for cyclic movement along a closed path between a first position at which the gripper unit is disposed above said delivery outlet and a second position at which the gripper unit is disposed centrally above an empty closure cap, the hollow side of which is directed upwards, said gripper unit comprising:

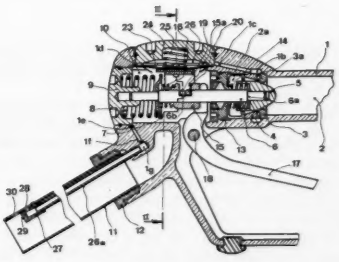
b1. a vertical pin-like plunger mounted for longitudinal displacement within an eccentric recess in a rotating head rotatable about a vertical axis, said plunger being adapted to be raised in the region of the delivery outlet into a receiving position in which the plunger lies close above and in contact with its bottom end with the plastic material being extruded from the said delivery outlet, and being adapted to be lowered in the region of the closure cap into a discharge position in which it is close to said cap;

b2. a vertical hollow cylindrical stripper element mounted for independent longitudinal displacement within the said eccentric recess, said plunger being slidable inside said cylindrical stripper element, said cylindrical stripper element terminating into a semicylindrical hollow portion adapted to co-axially project downwardly beyond the bottom end of the plunger when same is in its said raised position, so as to be tangent to the said delivery outlet, with its concavity directed in the direction of movement of the gripper unit, and adapted to be raised with respect to the bottom end of said plunger when same is in its lowered position in the region of the closure cap.

3,877,498
NOZZLES OF FLUID DISPENSING VALVES OF THE AUTOMATIC SHUTOFF TYPE

Jacques Lancellin, Suresnes, France, assignor to Volucompteurs Aster-Boutillon, Montrouge, France

Filed Jan. 15, 1973, Ser. No. 323,460
Claims priority, application France, Jan. 17, 1972, 72.01418
Int. Cl. B65b *57/14*
U.S. Cl. 141—198 **3 Claims**



1. An apparatus for dispensing liquids into a receiver and responsive to the rising liquid level in the receiver to terminate dispensing, the apparatus comprising

a hollow body;

an input conduit connected to said body and connectable to a fluid source for conducting fluid into said body;

valve means in said body for controlling the flow of liquid therethrough;

manually operable means connected to said body for opening said valve means;

An outlet tube connected to said body to convey and dispense liquid flowing from said valve means, said outlet tube having an open discharge end;

an air tube extending from a point near said discharge end to said body along said outlet tube and including means defining a first opening near said discharge end for connecting the inner space of the air tube to the space outside of said outlet tube;

means in said air tube defining a second opening near said discharge end for connecting the inner space of the air tube with the inner space of the outlet tube;

means in said outlet tube defining a third opening for permitting air flow into said outlet tube adjacent said second opening; and

means in said body sensitive to a sudden decrease in air pressure in said air tube, caused by the arrival of the rising liquid level in said receiver at said openings in said air tube for controlling the shutoff of said valve means.

3,877,499

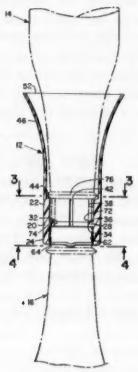
FLUID COUPLING DEVICE

Alfred Fluster, 1560 S. McPherrin, Monterey Park, Calif. 91754

Filed May 14, 1973, Ser. No. 360,201

Int. Cl. B65b *3/06*

U.S. Cl. 141—310 **4 Claims**



1. A coupling device for transferring viscous fluid from the mouth opening of a first bottle to the mouth opening of a second bottle, comprising:

an upper coupling section into which the mouth of a first bottle is insertable and a lower coupling section into which the mouth of a second bottle is insertable;

an annular flange between said coupling sections whereby said mouths are disposable adjacent to each other on opposite sides of said flange, said flange having a periphery which defines an opening for said transfer of fluid;

an annular shoulder in said upper coupling section for positioning said first bottle, spaced upwardly from said flange;

a funnel flared outwardly above said shoulder wherein bottles of different sizes can be positioned in said upper coupling section; and

a continuous air passageway formed in said upper coupling section shoulder and said flange for enabling air in said second bottle to be displaced by fluid in said first bottle.

3,877,500

ROTARY TOOL GUARD

Jamie F. Ulmer, Rt. 1, Hwy. 70, Mount Juliet, Tenn.

Filed July 13, 1973, Ser. No. 378,987

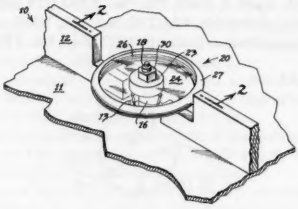
Int. Cl. B27g *19/00*

U.S. Cl. 144—251 A **4 Claims**

1. A guard for a rotary tool apparatus having a platform, a vertical spindle projecting above said platform and rotatably driven about its vertical axis, and a rotary tool fixed to the portion of the spindle adjacent and above said platform for operating upon work upon said platform in engagement with said tool, comprising:

a. a disc-shaped guard member having a diameter greater than the maximum diameter of the swath of said rotary tool,

b. means supporting said guard member coaxially upon said spindle above said rotary tool, and



c. said guard member comprising an annular body portion of solid, circumferentially uninterrupted, transparent material, to permit continuous vision through said annular body portion, even while said guard member is rotating, said guard member further being provided with a rim of soft resilient material fixed to and surrounding the periphery of said transparent annular body portion.

3,877,501

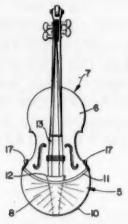
PROTECTIVE JACKET FOR STRING MUSICAL INSTRUMENTS

John S. Toth, 309 Mariellen St., Mishawaka, Ind. 46544

Filed Sept. 26, 1973, Ser. No. 400,977

Int. Cl. G10g *7/00*

U.S. Cl. 150—52 R **5 Claims**



1. A protective jacket for a musical instrument, such as a violin, said jacket comprising an elongated bag-shaped body including a front wall, a rear wall and a side wall connecting said front and rear walls, said jacket being adapted to engage over the outer end of an instrument box, and elastic loops connected to end portions of said side wall and adapted to detachably engage over the ears of the box.

3,877,502

NUT LOCKING MEANS AND METHOD FOR MUFFLER CLAMPS

Paul J. Hunckler, Huntington, Ind., assignor to Hunckler Products, Inc., Huntington, Ind.

Filed Aug. 29, 1973, Ser. No. 392,658

Int. Cl. F16b *39/24*

U.S. Cl. 151—20 **3 Claims**

1. A nut locking combination comprising

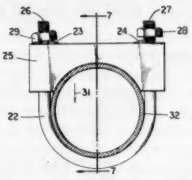
an apertured member having upper and lower flat faces and a hump adjacent said aperture on one face thereof and extending only a portion of the circumference of the aperture through less than 90°;

a threaded fastener extending through said member;

a nut threadedly received on said fastener and engaging said first member, an inner portion of said nut, adjacent the

thread on the fastener, engaging the upper face of said hump, engaging the flat surface of said member and thereupon imposing on said nut a tilted attitude with respect to said member and to said thread whereupon a binding action of said nut with respect to said thread and said member is obtained;

and said member being a saddle clamp having a pair of apertures therein horizontally spaced from each other



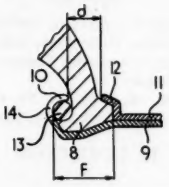
and each of said apertures having one of said humps therein, the humps being on a line between the apertures and each of said apertures receiving a threaded end of a U-bolt therethrough, each threaded end receiving a nut thereon engageable by said hump to impose a tilting action on the nut with respect to the threaded portion of the bolt and the saddle clamp and thereby impose a binding action between the nut and the bolt and the saddle clamp.

3,877,503

METHOD FOR ANCHORING A PNEUMATIC TIRE TO THE RIM AND PNEUMATIC WHEEL SO OBTAINED

Giorgio Tangorra, and Italo Bertelli, both of Milan, Italy, assignors to Industrie Pirelli, S.p.A., Milan, Italy

Filed May 22, 1973, Ser. No. 362,666
Claims priority, application Italy, May 31, 1972, 25139/72
Int. Cl. B60c *15/02*
U.S. Cl. 152—379 **9 Claims**



1. A pneumatic wheel for vehicles, which comprises:

a tire provided with a tread, two sidewalls, and two beads, a rim with two seats, one for each bead, each seat having the shape of a circumferential channel with an opening for the introduction of each bead in the respective seat, the two ends of said opening being directed the one against the other, whereby the width of said opening is smaller than the maximum width of said seat, each bead having in cross-section a profile at least partially equal to that of the corresponding seat of the rim and substantially indeformable, said cross-section being smaller than the cross-section of said seat, and

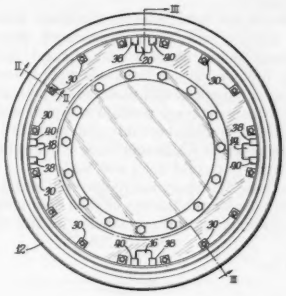
an additional forcing element being inserted between the outermost end of said opening and an underlying portion of the bead, whereby said two ends of the opening surround on one side at least a part of said cross-sectional profile of the bead to lock said bead in its own channel, the material of said additional element having a modulus of resistance to compression which is of the same order as that of the compound forming the beads or higher than it.

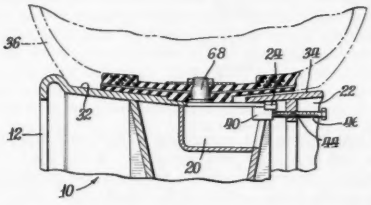
3,877,504

RIM CONSTRUCTIONS

Charles E. Grawey, Peoria; Robert W. Untz, Hanna City; Keith E. Koch, Tremont, and Charles F. Gebhardt, Decatur, all of Ill., assignors to Caterpillar Tractor Company, Peoria, Ill.

Filed Oct. 1, 1973, Ser. No. 402,268
Int. Cl. B60b *23/00, 25/02*
U.S. Cl. 152—405 **8 Claims**





1. A rim assembly for a pneumatic tire carcass comprising: a first annular rim portion defining at least one guide pocket; a second annular rim portion; a guide member fixed to the second rim portion and positionable in the guide pocket to position the first and second rim portions relative to each other as they are brought together; removable means for fixing the so positioned first and second rim portions together, said rim portions when so fixed together forming a rim for said pneumatic tire carcass; and means for separating the first and second rim portions upon removal of the means for fixing the so positioned first and second rim portions together comprising a plurality of force pads fixed to the first rim portion, and a plurality of corresponding bolts threadably associated with the second rim portion and positioned so that upon rotation thereof of one direction, said bolts contact respective force pads and urge the first and second rim portions apart.

3,877,505

UPPER BEAD BREAKER MECHANISM

David W. Besuden, 6800 Tupelo Ln., Cincinnati, Ohio 45243, and William G. Brosene, Jr., 9664 Lansford Dr., Cincinnati, Ohio 45242

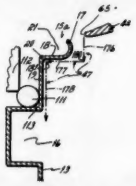
Continuation-in-part of Ser. No. 328,008, Jan. 30, 1973, abandoned. This application May 13, 1974, Ser. No. 469,122
Int. Cl. B60c *25/06*
U.S. Cl. 157—1.28 **8 Claims**

1. An improved upper bead breaker mechanism for an automatic tire changer machine, said upper bead breaker mechanism being adapted to break a tire's upper bead away from a wheel's upper rim when said wheel is positioned on said machine's table, comprising

a blade adapted to move downwardly along a programmed and controlled path, said path including a first downward segment relative to the plane of said table that locates the blade's lip beneath the wheel rim's flange from an initial operational position where said blade rests on the tire's side wall, a second radially inward segment relative to said wheel that locates the blade's lip over the tire's bead, and a third downward segment relative to the plane of said table that breaks the tire's bead away from the wheel's rim,

a power column that interconnects said blade with a power unit for moving said blade downwardly through said programmed and controlled path against the upward resistance provided by the tire's side wall, at least one of said power column and said blade being pivotable about an axis between a storage position at which said blade is swung out of operational relation with said tire's side wall and a use position at which said blade is swung into operational relation with said tire's side wall,

a restrainer device pivotally interconnected with said blade to maintain the blade's leading edge in operating proximity to the outer surface of the wheel's rim after said blade



has been swung into operational relation with said tire's side wall and when said power unit is activated, said restrainer device including a restrainer bar adapted to seat on the inside surface of the wheel's upper rim, and lock means partially carried by said blade and partially carried by said restrainer device, said lock means serving to maintain said blade in a substantially vertically downward path relative to the plane of said table during the first segment of said travel path, said blade escaping that portion of said lock means carried by said restrainer device as it traverses said first segment until same is released therefrom at the end of said first segment so as to permit said blade to traverse said second segment immediately upon being so released.

7. An improved bead breaker for an automatic tire changer machine, said bead breaker being adapted to break a tire's bead away from a wheel's rim, comprising

a blade connected to a power unit, said blade being directed against a tire's side wall by said power unit, and

a slip shoe interposed between said blade and said side wall, said slip shoe serving to aid said blade in its radially inward motion toward the wheel's center as said blade is directed against the tire's side wall.

3,877,506

TIRE BUFFING MACHINE

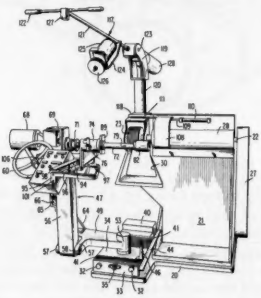
John R. Mattox, Rt. 3, Box 208-A, Charlotte, N.C. 28201, and Thomas W. Mattox, 7205 Morley Cir., Charlotte, N.C. 28214

Filed Apr. 8, 1974, Ser. No. 459,104

Int. Cl. B29h *21/08;* **B23d** *67/00*

U.S. Cl. 157—13 **18 Claims**

1. A machine for buffing tire casings comprising a horizontal axis rotary rasp and power means connected with the rasp to turn it, a carriage mounted for linear movement toward and away from the rasp at an elevation below the axis of the rasp, precision power-operated screw shaft means connected with the carriage to move it horizontally in a linear path forwardly and rearwardly relative to the rasp, a vertical axis pivot element on said carriage disposed substantially in a vertical plane through the transverse center of the carriage and through the center of the rasp, a horizontally swingable support arm journaled on said vertical axis pivot element, a horizontal axis pivot element on said horizontally swingable support arm, a vertically swingable support arm extending above the horizontally swingable arm and pivotally connected with said horizontal axis pivot element, a precision screw shaft feed means coupled to the vertically swingable support arm to swing the



same in a vertical plane toward and away from said rasp, the vertically swingable arm being laterally offset from said rasp, a horizontal tire casing drive and inflation shaft journaled for rotation on the upper end of the vertically swingable support arm at substantially the elevation of said rasp, power drive means for said drive and inflation shaft on the vertically swingable support arm, and a control console for the machine on the vertically swingable support arm including independent controls for the rasp power means, carriage screw shaft means and said power drive means for said drive and inflation shaft.

3,877,507

AUTOMATIC CASTING APPARATUS

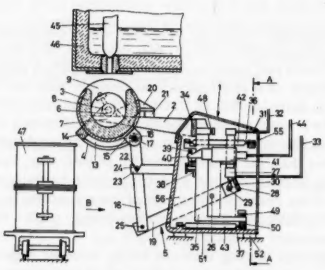
Fritz Hurter, and Hans Hollenstein, both of Schaffhausen, Switzerland, assignors to Georg Fischer Aktiengesellschaft, Schaffhausen, Germany

Filed Feb. 26, 1974, Ser. No. 446,013

Claims priority, application Switzerland, Mar. 6, 1973, 3247/73

Int. Cl. B22d *39/00*

U.S. Cl. 164—155 **9 Claims**



1. In an automatic casting apparatus, including casting molds serially arranged along a casting line, a weighing mechanism, a casting ladle operatively associated with said weighing mechanism, a stopper ladle arranged above said casting ladle for dispensing into said casting ladle a quantity of molten casting material determined by said weighing mechanism, and

a tipping mechanism for said casting ladle, the improvement wherein said weighing mechanism comprises, in combination, a housing, a pair of balance beams having a load end, a pivotal receiving device located at the load end of said balance beams and having said casting ladle detachably supported thereon, an operating lever for said tipping device having said receiving device movably connected therewith, fixed recess means located to supportively engage said operating lever of said tipping device when said casting ladle is in position for filling by said stopper ladle and weighing by said weighing mechanism, a pair of angle levers provided on said pair of balance beams, a fixed measuring element, a measuring beam secured on said pair of angle levers operatively connecting said pair of angle levers with said fixed measuring element, a pair of spring elements each connected between said housing and one of said pair of angle levers for movably supporting said angle levers, and at least one flexible stabilizing element for providing lateral stabilization for said pair of angle levers, said stabilizing element having a centrally located region secured upon said pair of angle levers and being secured at its ends to said housing.

3,877,508

APPARATUS WITH SELF-CENTERING STOOL FOR CONTINUOUS CASTING OF METALS

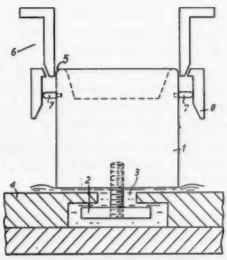
Neil Burton Bryson, Kingston, Ontario, Canada, assignor to Alcon Research and Development Limited, Montreal, Quebec, Canada

Filed Jan. 23, 1973, Ser. No. 326,078

Claims priority, application United Kingdom, Jan. 24, 1972, 3321/74

Int. Cl. B22d *11/08*

U.S. Cl. 164—274 **7 Claims**



1. A continuous casting apparatus comprising a vertically movable table having a horizontal upper support surface, adapted to support at least one ingot-receiving stool at a predetermined location on said upper surface, said table upper surface being flat at such location to permit lateral sliding movement of said stool and having an opening at such location for upward flow of fluid therethrough, a stool disposed on said table upper surface at such location and having a flat bottom surface for support by said table, said flat bottom surface extending at least continuously around the periphery of said opening, said stool being arranged to have at least limited free movement in relation to said table both horizontally and vertically, and means for supplying a fluid under pressure through said table and said opening to the underside of the stool at a location lying within said substantially continuous periphery of said flat bottom surface to establish a laterally escaping fluid layer between said table and said stool to lift said stool out of contact with the table, allowing lateral sliding movement of said stool without tilting in relation to said table.

3,877,509

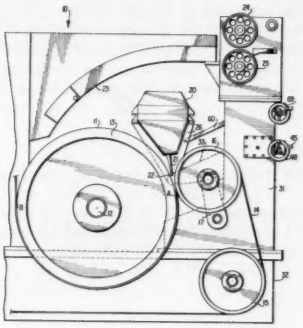
POUR POT MANIPULATOR

James Carroll Muller, Carrollton, Ga., assignor to Southwire Company, Carrollton, Ga.

Filed June 14, 1974, Ser. No. 479,448

Int. Cl. B22d *11/06*

U.S. Cl. 164—278 **15 Claims**



1. Apparatus for positioning a vessel relative to a casting wheel rotatable about an axis of rotation and having a peripheral groove partially closed by an endless band to define a casting mold, said band initially engaging said wheel at a first point defining a mold inlet and disengaging said wheel at a second point defining a mold outlet, a spout extending from and movable with said vessel through which molten metal is adapted to be poured into said mold inlet, cradle means for receiving said vessel, vertical adjustment means for adjusting the position of said cradle means and said spout relaive to said mold inlet along a straight substantially vertical line of motion substantially perpendicular to the axis of rotation of said wheel, horizontal adjustment means for adjusting the position of said cradle means and said spout relative to said mold inlet along a straight substantially horizontal line of motion substantially perpendicular to both the axis of rotation of said wheel and said vertical line of motion, and means for rotatably adjusting the position of said cradle means and said spout relative to said mold inlet about a rotational axis extending through said mold inlet substantially parallel to the axis of rotation of said wheel.

3,877,510

APPARATUS FOR COOLING A CONTINUOUSLY CAST STRAND INCORPORATING COOLANT SPRAY NOZZLES PROVIDING CONTROLLED SPRAY PATTERN

Richard J. Tegtmeier, Newtown, Pa.; Jimmy L. Helms, Ridgewood, and Karl L. Backhaus, West New York, both of N.J., assignors to Concast Incorporated, New York, N.Y.

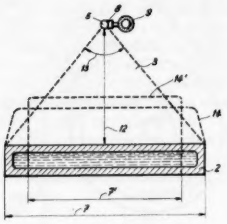
Filed Jan. 16, 1973, Ser. No. 324,541

Int. Cl. B22d *11/12*

U.S. Cl. 164—283 5 **18 Claims**

1. A cooling system for cooling a continuously cast strand, especially a steel strand of essentially rectangular cross-sectional configuration, comprising guide means for guiding a cast strand along a predetermined path of travel, at least one spray nozzle for producing a spray pattern of pressurized liquid coolant for impingement with the surface of the cast strand, said spray nozzle having inflow means for the pressurized liquid coolant and outflow means for the departure of said liquid coolant in the form of a spray pattern, said spray nozzle incorporating a nozzle body portion and means for closing the nozzle body portion at one end, means for connecting the opposite end of the nozzle body member with a supply infeed for the liquid coolant, said inflow means and outflow means of said spray nozzle providing respectively

different flow directions for the liquid coolant, said outflow means incorporating means defining a substantially slotted outlet opening at said nozzle body member, said slotted outlet opening extending substantially transversely with respect to the lengthwise axis of the cast strand, said slotted outlet opening defining a discharge for the liquid coolant in the form of said spray pattern, said liquid coolant impinging the surface of the cast strand over an impingement area, to produce substantially uniform cooling of the cast strand over its transverse width dimension, and wherein the distribution of liquid coolant is substantially uniform across at least the major extent of



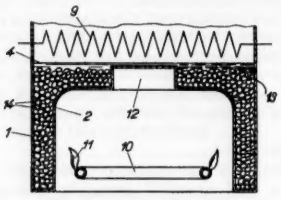
said impingement area, said slotted outlet opening comprises a slot possessing a substantially rectangular configuration, said slot being bounded by faces extending substantially perpendicular to the lengthwise axis of the cast strand and the lengthwise axis of the nozzle body member and serving to control the thickness of the spray pattern and the impingement area for a given distance between said slotted outlet opening of the nozzle and the surface of the cast strand impinged by the spray pattern, said slotted outlet opening of said spray nozzle producing a spray pattern bounded by substantially straight parallel lines extending transversely across the strand surface.

3,877,511

METHOD AND APPARATUS FOR DAMPENING NOISE OCCURRING IN LIQUID HEATERS OPERATING ACCORDING TO THE VACUUM VAPORIZATION PRINCIPLE

Willi Brandl, Zurich; Zdenek Koula, Regensdorf, and Peter Nirk, Zug, all of Switzerland, assignors to Stotz & Co., Zurich, Switzerland

Filed Oct. 19, 1972, Ser. No. 299,036
Int. Cl. F28
U.S. Cl. 165—1 **18 Claims**



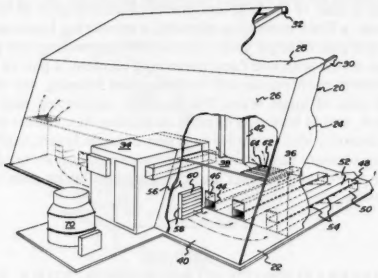
1. A method for dampening the development of sound occurring at a liquid heater having a vacuum vessel adapted to contain a heating liquid and operating according to the vacuum vaporization principle owing to pronounced development of vapor at the heating surfaces thereof, comprising the steps of providing noise suppression means comprising particulate material having a grain size less than 5 mm, said material disposed within said vacuum vessel and at least partially filling the space therein occupied by said heating liquid, and opposing the formation of vapor bubbles at the heating liquid by means of said noise suppression means.

3,877,512

APPARATUS AND METHOD FOR STORING PERISHABLE MATERIAL

William M. Francis, Portland, Oreg., assignor to Industrial Refrigeration and Equipment Company, Portland, Oreg.

Filed July 15, 1971, Ser. No. 162,777
Int. Cl. F24f *3/4*
U.S. Cl. 165—3 **20 Claims**



1. A method for storing potatoes in a housing and wherein the atmosphere inside of said housing is referred to as a first atmosphere and the atmosphere outside housing is referred to as a second atmosphere, said method comprising:

a. upon achieving a desired temperature in said first atmosphere, then maintaining the temperature of said first atmosphere within a 5°F. range in a range of about 35°F. to approximately, 65°F.;

b. upon achieving a desired relative humidity in said first atmosphere, then maintaining the relative humidity of said first atmosphere in the range of about 75 percent to, approximately, 99 percent relative humidity;

c. in maintaining the temperature of said first atmosphere having the flexibility of recycling and adjusting the temperature of said first atmosphere to form an adjusted first temperature atmosphere and introducing said adjusted first temperature atmosphere into said housing, and having the flexibility when desirable, of blending part of the first atmosphere with the second atmosphere to form a blended temperature atmosphere into said first atmosphere in said housing; and,

d. in maintaining the humidity of said first atmosphere having the flexibility of recycling and adjusting the humidity of said first atmosphere to form an adjusted humidity first atmosphere and introducing said adjusted humidity first atmosphere into said housing, and having the flexibility when desirable of blending part of the first atmosphere with the second atmosphere to form a blended humidity atmosphere and to introduce said blended humidity atmosphere into said first atmosphere in said housing.

3,877,513

CONTROL OF AIR CONDITIONING APPARATUS

Arthur E. Arledge, Jr., Cazenovia, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Aug. 2, 1973, Ser. No. 385,023
Int. Cl. F28f *27/02*
U.S. Cl. 165—26 **4 Claims**

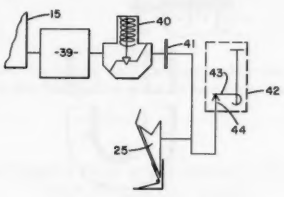
1. A control for determining the flow path of air induced from a space into a mixing chamber of an air conditioning unit by the discharge of primary air within the casing of said unit and having a first heat exchanger connected to a source of a relatively cold heat exchange medium and interposed in a first flow path, a second heat exchange medium and interposed in a first flow path, a second heat exchanger connected to a source of a relatively warm heat exchange medium and inter-

posed in a second flow path and a third flow path bypassing said first and second flow paths, said control comprising:

a. an inflatable bellows connected to said source of primary air;

b. thermostatic means for sensing the temperature of said space being conditioned for regulating the pressure of said primary air in said inflatable bellows; and

c. damper means operatively connected to said inflatable bellows for directing the induced air through one of said flow paths; said damper means including link means connected to said inflatable bellows and first and second dampers pivotally connected to said link means, said first damper being movable relative to said first heat exchanger to selectively open or close the flow path including said first heat exchanger, said second damper being movable relative to said second heat exchanger to selectively open or close the flow path including said second heat exchanger, said first and second dampers in combination operating to selectively open or close said third flow path; said link means including a first link having a pair of elongated slots, said first and second dampers having pins disposed in said slots; as pressure in said bellows increases in response to sensed changes in the temperature in said space, a selected one of said flow path is opened and said other two flow paths are closed, as the pressure in said bellows decreases, a selected second of said flow paths is opened and said other two flow paths are closed, and as the pressure in said bellows further decreases, a selected third of said flow paths is opened and said other two flow paths are closed, to thereby continuously regulate the temperature of air discharged from said unit into said space to maintain the temperature of the air in said space at a desired level.



3,877,514

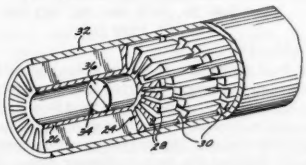
HEAT EXCHANGER VALVE SYSTEM

Theodore A. Beck, Riverside, Calif., assignor to Hayden Trans-Cooler, Inc., Corona, Calif.

Filed June 19, 1972, Ser. No. 263,930

Int. Cl. F28f *27/02*

U.S. Cl. 165—38 **10 Claims**



1. Heat exchange unit which comprises an elongated central tubular core, a plurality of elongated generally longitudinally arranged, circumferentially spaced heat transfer fins extending generally radially outwardly from said core, both sides of each of said fins being concavely curved in the general radial direction throughout substantially their entire radial width with their outer edges being thicker than inner portions thereof and an elongated, tubular shell peripherally engaged about and in heat conducting abutting relationship with the outer edges of said fins, said core, fins and shell defining a plurality of fluid flow channels between adjacent pairs of the fins, said central tubular core defining bypass flow conduit means extending generally longitudinally therethrough, with the ends of said channel means being in fluid communication with the respective ends of said conduit means, and bypass valve means in said conduit means, said channel means being adapted to conduct heat transfer fluid in normal heat exchange flow through said unit, and said valve means having at least one operative condition wherein it is adapted to bypass a portion of said fluid from said channel means through said conduit means.

3,877,515

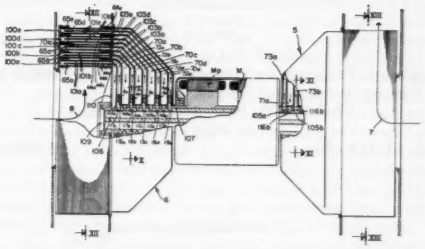
TEMPERATURE-CONTROL SYSTEM WITH ROTARY HEAT EXCHANGERS

Nikolaus Laing, Hofener Weg 35-37, 7141 Aldingen, Germany

Continuation-in-part of Ser. No. 847,771, June 17, 1969, abandoned. This application Sept. 5, 1972, Ser. No. 286,569

Int. Cl. F28f *5/00;* **F28d** *11/00*

U.S. Cl. 165—86 **9 Claims**



1. A temperature-control system for a space provided with means for maintaining a first fluid therein at a temperature differing substantially from that of a second fluid in an adjoining environment, comprising:

a first rotary heat exchanger centered on an axis and exposed to said first fluid in said space;

a second rotary heat exchanger centered on said axis and exposed to said second fluid in said adjoining environment, each of said heat exchangers including a set of peripherally spaced tubes parallel to said axis, the tubes of each set being disposed along at least one segment of an archimedean spiral to define a hollow blade;

drive means coupled with said heat exchangers for rotating same about said axis;

sealed conduit means including said tubes forming a closed path for a heat-carrier medium abstracting heat from the warmer one of said fluids and giving off heat to the colder one of said fluids; and

forced-circulation means in said path for driving said medium through said conduit means under a pressure maintaining a coherent flow of said medium at substantially uniform speed between said heat exchangers.

3,877,516

CONDENSER FOR STREAMS OF GAS, IN PARTICULAR STREAMS OF GAS EXITING FROM THE WASH TANK OF PLANTS FOR DRY CLEANING

Guido Zucchini, Via del Lavoro n. 6, Castel Maggiore, Italy

Filed Mar. 6, 1973, Ser. No. 338,624

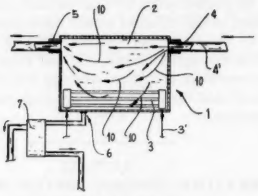
Claims priority, application Italy, Mar. 10, 1972, 3361/72

Int. Cl. F28b *11/00*

U.S. Cl. 165—111 **4 Claims**

1. Condenser for hot gas, particularly for hot gas from a wash tank of a plant for dry cleaning, comprising:

a condensation chamber having inlet means and outlet means for establishing a direct stream of gas from the inlet means to the outlet means; and cooling tubes extending through a portion of the condensation chamber normally by-passed by said direct stream, said cooling



tubes providing means for influencing gas to separate from said direct stream and to flow towards and between the cooling tubes so as to gradually cause condensation to be effected proportionally with the cooling capacity of the tubes.

3,877,517

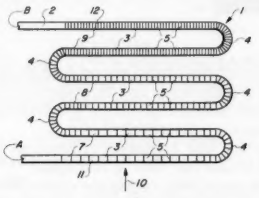
HEAT EXCHANGERS

Stephan F. Pasternak, Park Ridge, Ill., assignor to Peerless of America, Incorporated, Chicago, Ill.

Filed July 23, 1973, Ser. No. 381,865

Int. Cl. F28f *13/14*

U.S. Cl. 165—146 **6 Claims**



1. A heat transfer element comprising

a. a tubular member having an elongated wall, having two pairs of oppositely disposed longitudinally extending sides,

b. said tubular member being bent back and forth in a serpentine pattern to afford

1. a plurality of elongated passes laterally spaced from each other from one side to the opposite side of said pattern, and

2. a plurality of return bends interconnecting respective pairs of said passes,

c. said return bends and said passes being disposed in substantially uniplanar relation to each other,

d. said oppositely disposed sides in one of said pairs being disposed on the outside and inside of said return bends,

e. a plurality of fins

1. having base portions formed integrally with at least one of said oppositely dispoed sides in only the other of said pairs,

2. spaced from each other longitudinally of passes, and

3. projecting outwardly from said wall transversely to said plane, and

f. said fins on respective ones of said passes being spaced progressively closer to each other longitudinally of said tubular member from said one side to said opposite side of said pattern.

3,877,518

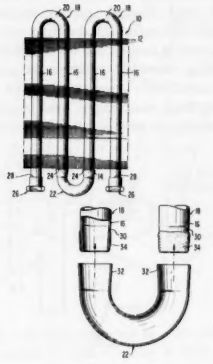
HEAT EXCHANGE COIL

Moshe Y. Dreksler, RR 2, Locust Rd., Harwinton, Conn.

Filed Mar. 19, 1971, Ser. No. 125,988

Int. Cl. F28f *9/08*

U.S. Cl. 165—150 **3 Claims**



1. In a heat exchange coil of the type including a plurality of adjacently positioned first hairpin shaped aluminum tubes carrying internally, a high pressure fluid, and being commonly supported by a plurality of longitudinally spaced heat exchange fins with the straight portions of said tubes extending through holes within the fins and with the ends of two separate tubes being joined by a second, U-shaped return bend aluminum tube, the improvement wherein: the ends of one of said tubes are flared and the ends of said other tubes are necked to define axially opposed tapered mating surfaces, and wherein said tubes are coupled together solely by a uniform thickness epoxy adhesive between said mating surfaces to complete a high integrity, fluid seal bond therebetween of sufficient strength to prevent longitudinal separation of the return bend tube from the straight portions of the tubes joined thereto due to the high fluid pressure acting directly on said return bend tube and creating a resultant force tending to longitudinally separate the return bend tube from said hairpin tubes.

3,877,519

PRESSURIZED STRONGBACK REGENERATOR

Salvatore S. Tramuta; James G. Miller, both of Schenectady, and William M. Knox, Amsterdam, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed July 30, 1973, Ser. No. 383,705

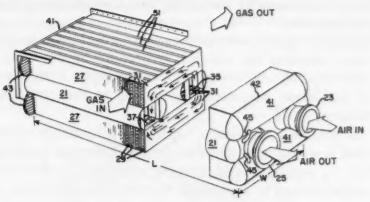
Int. Cl. F28f *3/00*

U.S. Cl. 165—166 **8 Claims**

1. In a heat exchanger of the type having a stack of heat exchanger plates arranged in close, spaced relationship so as to define alternating first and second fluid flow passages therebetween, and means for directing high pressure fluid into and from said first passages, the improvement comprising:

means for holding the heat exchanger plates of each said stack together, said means comprising a pressure chamber at each end of said stack of plates, each said pressure chamber including a generally flat bottom plate and an arcuate outer wall, each said pressure chamber disposed with its flat bottom plate abutting and covering the first heat exchanger plate at its end of the stack, means connecting said pressure chambers to each other, and means for pressurizing said pressure chambers, whereby the pressure forces generated by said high pressure fluid in

said first passages and which tend to urge the plates forming each first passage to separate are countered by the



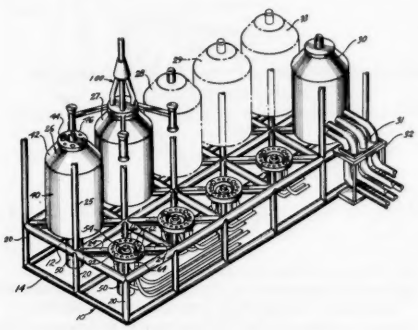
pressure forces in said pressure chamber which act against the flat bottom plate of said chamber.

3,877,520

SUBSEA COMPLETION AND REWORK SYSTEM FOR DEEP WATER OIL WELLS

Paul S. Putnam, 8931 La Entrada Ave., Apt. A, Whittier, Calif. 90605

Filed Aug. 17, 1973, Ser. No. 389,248
Int. Cl. E21b *33/035*
U.S. Cl. 166—.6 **26 Claims**



7. Subsea well completion apparatus for providing completion of wells drilled in the sea floor comprising: a frame adapted to be positioned on the sea floor, the frame having an opening through which a well is drilled, a plurality of flow lines mounted on and secured to the frame, a plurality of stab connectors mounted on the frame and positioned in proximity to said opening, the flow lines terminating in the stab connectors, and plug-seating nipple means for receiving a line plug positioned in each of the flow lines, an enclosed wellhead completion module including a valve tree and flow lines connected to the valve tree, means connecting the valve tree to the top of the well, and a plurality of flow line stab connectors on the end of the flow lines in the completion module and positioned on the bottom of the module to engage the stab connectors in the frame when the valve tree is connected to the well.

3,877,521

TERTIARY RECOVERY OPERATION

Anthony F. Altamira, Dhahran, Saudi Arabia, and Donald L. Hoyt, Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Apr. 8, 1974, Ser. No. 458,918
Int. Cl. E21b *43/16*
U.S. Cl. 166—245 **5 Claims**

1. During a recovery operation, a method of producing formation fluids including hydrocarbons from a subterranean hydrocarbon-bearing formation by a direct line drive which comprises penetrating said formation with a plurality of wells disposed in a linear pattern and comprising a series of a pair of production wells and an intermediate injection well, injecting an extraneous driving fluid into said formation via the intermediate injection well to displace formation fluids including hydrocarbons in said formation toward said production wells, producing said formation fluids including nydrocarbons from said formation via said production wells, said producing of said formation fluids and said injecting of said extraneous fluid being at such rates that the production wells in alternate series of wells of said pattern undergo breakthrough of said extraneous fluid initially, thereafter continuing producing said formation fluids while injecting said extraneous fluid until breakthrough of said driving fluid at the production wells in the series of wells alternate to those which had undergone breakthrough initially, thereupon initiating an additional recovery operation by imposing a new set of flow gradients comprising the steps of shutting in the intermediate injection wells in said series and converting production wells in said series which had undergone breakthrough of said driving fluid initially into injection wells, and thereafter producing formation fluids via the remainder of said production wells.

3,877,522

USE OF RADIATION-INDUCED POLYMERS IN CEMENT SLURRIES

Bruce L. Knight; John S. Rhudy, and William B. Gogarty, all of Littleton, Colo., assignors to ICI United States Inc., Wilmington, Del.

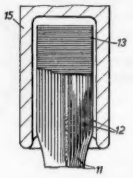
Filed Nov. 6, 1972, Ser. No. 303,736
Int. Cl. E21b *33/13*
U.S. Cl. 166—295 **16 Claims**

1. In the process of cementing a well in fluid communication with a subterranean reservoir wherein a cement slurry is injected down the well bore, the cement slurry containing a high molecular weight polymer dissolved in the water phase of the cement slurry to inhibit fluid loss from the cement slurry, the step comprising incorporating within the aqueous phase of the cement slurry a polymer obtained as a product of high energy ionization radiation polymerization of at least one monomer selected from the group consisting of acrylamide and methacrylamide and at least one monomer selected from the group consisting of acrylic acid, methacrylic acid, alkali metal acrylate, and alkali metal methacrylate in concentrations of about 10% to about 60% by weight dissolved monomer in an aqueous medium, the radiation intensity being about 250 to about 1,000,000 rads/hr and the radiation dose being about 500 rads to about 300,000 rads.

3,877,523
ELONGATED COMPOSITE TENSION MEMBERS

Richard Anthony Ely, Redmarley, England, assignor to Transmission Developments Limited, Gloucester, England

Filed June 27, 1973, Ser. No. 374,134
Claims priority, application United Kingdom, June 30, 1972, 30780/72
Int. Cl. B32b 5/12
U.S. Cl. 403—202 7 Claims

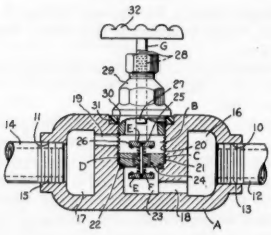


1. An elongated composite tension member comprising a plurality of reinforcing laminations including continuous reinforcing fibres, selected from the class consistng of glass, carbon and metal wire, extending parallel with the length of the member, combined with a synthetic hardenable resinous material, the member having an anchorage portion where mutually opposed external surfaces of the member are formed to define transverse depressions, capable of providing a mechanical force transmitting surface, and at least one cross-reinforcing lamination of continuous reinforcing fibres all lying in a plane parallel with the planes of the first mentioned laminations and all extending longitududinally between the surfaces providing said anchorage formations, each of the cross-reinforcing laminations having substantial shear strength to resist shear in a plane parallel with the length of the member and parallel with the surfaces of the member in which the said anchorage formations are provided, and having substantial tensile strength in directions transverse to the length of the member, and transverse to the plane of the surfaces of the member in which the said anchorage formations are provided.

3,877,524
FLUID SYSTEM

William S. Glenn, Jr., P.O. 76, Spartanburg, S.C. 29601

Filed Nov. 29, 1973, Ser. No. 420,017
Int. Cl. A62c 35/30; F16k 17/04
U.S. Cl. 169—17 3 Claims



1. For use in a dry pipe fire sprinkler system having several sprinkler nozzle systems for dispensing water and a compressor supplying air under pressure to the sprinkler nozzle systems, a valve interposed between said compressor and each of said nozzle systems so as to control the flow of air to said nozzle systems comprising:

A. a housing having a flow path between inlet and outlet ports in said housing;

B. said housing having a chamber interposed in said flow path;

C. a sealing member extending across said chamber having a passageway for air to flow therethrough;

D. a plunger extending through said sealing member at right angles thereto;

E. a closure member carried by said plunger for closing said passageway;

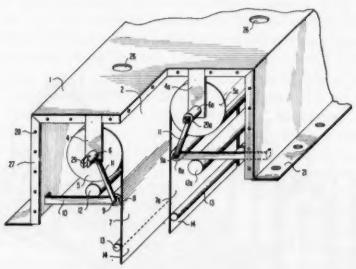
F. resilient means normally urging said closure member to open position but which is overcome by the force of air delivered by said compressor means upon a pressure drop of sufficient magnitude occurring at the outlet of said housing; and

G. a manually adjustable operator threadably carried by said housing in alignment with said plunger being operable to maintain said closure member in open position when moved to a position to overcome the force of said resilient means and the force of air delivered by said compressor to permit air delivered by said compressor to flow freely through the valve to build up air pressure in the nozzle system associated therewith.

3,877,525
FLAME-GUARD DEVICE FOR ISOLATING AND STEPPING OF PREMISES

Jean Henri Husson, 34 Avenue du President Franklin Roosevelt, Fontainebleau-Avon, and Marie Simonel, 9 Rue des Pervenches, 92 Bagneux, both of France

Filed July 23, 1973, Ser. No. 381,609
Claims priority, application France, Aug. 3, 1972, 72.28074; Dec. 28, 1972, 72.46787
Int. Cl. E06b 5/16
U.S. Cl. 169—48 27 Claims



1. A fire-protecting device comprising:

at least one liquid porous, flexible screen, said screen being stocked at the top of an area to be fire-protected;

means to cause one end of said screen to go downward upon outbreak of fire; and

means provided at the top of the area to be fire-protected and outside the stock of the screen for impregnating said screen with an aqueous liquid from bottom to top of said screen as said screen is travelling downward and continuously impregnating said screen thereafter;

whereby said screen is simultaneously going downward and being impregnated with said aqueous liquid.

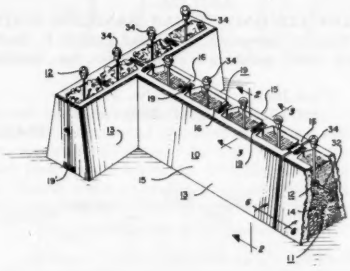
3,877,526
EXPLOSION AND FIRE BARRIER

William R. Dolbeer, 3524 Windsor Dr., Boise, Idaho 83705, and George N. Robertson, II, 1857 Appletree Ln., Mountain View, Calif.

Filed Sept. 18, 1973, Ser. No. 398,520
Int. Cl. A62c 35/16
U.S. Cl. 169—48 3 Claims

1. An explosion and fire barrier comprising: a pair of disposingly disposed revetment panels fabricated as a pre-cast con-

crete member with a major wall and a plurality of laterals which issue from and at intervals between terminal ends of one side of said major wall, said major wall being inclined centrally from its bottom to its top, the terminal end opposite the major wall contacting end of said laterals being provided with a substantially vertical abutting edge to mate with the opposing abutting edge of the lateral of the opposingly abuttor revetment, said revetment panels being connected by a connector mounter at the uppermost terminal edge adjacent said



abutting edge of said lateral and a connector disposed at one side of the lowermost portion of said abuttor laterals adjacent said abutting edge; and fill material disposed within cavities formed by said disposed revetment panels and a sprinkler system comprising multiple use sprinklers connected to a supply conduit disposed through a recess in said laterals on risers, and means for controlling said sprinklers for irrigation of said fill material and for automatically supplying water under pressure to said sprinklers in case of fire or excessive heat.

3,877,527

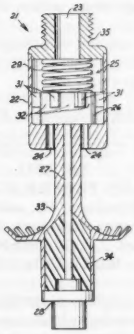
THERMALLY INSULATED ACTUATOR FOR FIRE SPRINKLER HEADS

Wilfred V. Johnson, 36 Rocky Hill Rd., Oxford, Mass. 01540

Continuation-in-part of Ser. No. 143,394, May 14, 1971, Pat. No. 3,802,510. This application Sept. 24, 1973, Ser. No. 399,852

Int. Cl. A62c *37/08*

U.S. Cl. 169—90 **12 Claims**



1. A valve assembly for use in automatic fire extinguishing systems and comprising:

a housing defining a fluid passage therethrough;

a valve member in said passage for controlling the flow of fluids therethrough;

temperature responsive actuator means for operating said valve member in response to ambient temperature changes, said actuator means further comprising an actuator housing and a recyclable actuator means for repeatedly operating said valve member in response to repeated ambient temperature changes; and

temperature insulation means for securing said actuator housing to said housing and for restricting thermal communication therebetween.

3,877,528

DRILL WAGON FOR TRANSPORTING AND ERECTING ROCK DRILLING RIGS

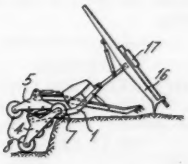
Olav Reiersdal, Sandvatan St. 4480, Kvinesdal, Norway

Filed Oct. 1, 1973, Ser. No. 402,535

Claims priority, application Norway, Oct. 26, 1972, 3864/72

Int. Cl. E21c *11/02*

U.S. Cl. 173—23 **3 Claims**



1. An improved drill wagon for transporting and erecting rock drilling rigs comprising a mobile undercarriage and an obliquely upwardly directed boom secured thereto, a drill feed frame pivotally mounted to the free end of the boom, and at least one support leg mounted on the undercarriage and capable of being raised and lowered hydraulically wherein the improvement comprises the following further features in combination:

a. two bogies are provided for the undercarriage, said bogies being pivotally mounted approximately at the centre of their length and being pivotable about an axis transverse to the longitudinal axis of the undercarriage

b. said bogies are pivotable independently of one another respective driving means, and

c. said bogies are sufficiently short and arranged sufficiently far out at the end of the undercarriage opposed to the boom, that the plumb-line through the centre of gravity of the entire apparatus is outside the support surface of the bogies.

3,877,529

METHOD OF ASSEMBLING DRILL STRING USING FLUID SAVER VALVE

Mason Rawleigh Litchfield, Houston, Tex., assignor to Smith International, Inc., Midland, Mich.

Division of Ser. No. 335,489, Feb. 26, 1973. This application July 10, 1974, Ser. No. 484,814

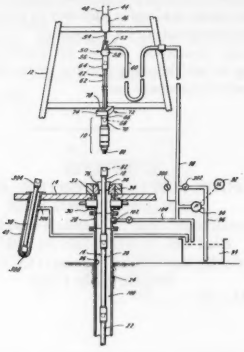
Int. Cl. E21b *19/16*

U.S. Cl. 175—65 **5 Claims**

1. In the process of adding a section of drill pipe to a rotary drill string suspended in a well bore from a kelly by means including a drilling fluid saver valve assembly having a rotatable sleeve to open and close the drilling fluid saver valve, the

method comprising the steps of:

rotating the sleeve to close the drilling fluid saver valve, and



rotating further the sleeve to disconnect the kelly from the drill string.

3,877,530

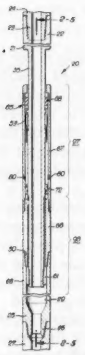
HYDRAULIC DRILLING JAR

Jim L. Downen, 2931 Pierce Rd., Bakersfield, Calif. 93308

Filed June 21, 1974, Ser. No. 481,552

Int. Cl. E21b *1/10*

U.S. Cl. 175—297 **8 Claims**



1. A hydraulic drilling jar comprising

an upper sub provided with a threaded box for suspending the jar from the lower end of a drill string;

a lower sub provided with a threaded pin for suspending a tool assembly from said jar, said lower sub terminating integrally upwardly in a heavy external sleeve;

a spline sub, interconnected at its lower end with said lower sub to bare an annular anvil face on the lower end of said spline sub, the bore of said spline sub having splines extending radially inwardly from said bore;

a heavy tubular jar mandrel formed integrally with said upper sub and being integral, with an approximately uniform wall thickness, throughout its length, said mandrel slideably fitting within said spline sub bore and extending down through the spline sub, grooves being provided externally lengthwise where necessary in said mandrel to slideably receive said splines;

hammer means on the lower extending end portion of said mandrel, said means having an annular hardened hammer face exposed upwardly in opposition to said anvil face;

relatively light sleeve means provided on the upper end of said spline sub and extending upwardly in sheathing spaced relation with said mandrel; and

dashpot hydraulic jar tensioning and tripping means mounted in the annular space between said light sleeve means and said mandrel.

3,877,531

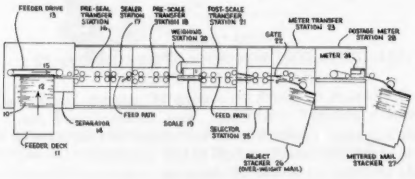
AUTOMATIC CONTINUOUS MAIL HANDLING SYSTEM

Anthony Storace, Tarrytown, N.Y., and Fredric E. Zucker, Stamford, Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed June 5, 1974, Ser. No. 476,618

Int. Cl. G01g *23/38*; B65g *69/00*

U.S. Cl. 177—1 **19 Claims**



1. A method of continuously processing a large volume of mixed mail, whereby individual pieces of mail are continuously fed with a substantially vertical orientation in seriatim along a feed path comprising a weighing station and a postage meter station, each piece of mail being weighed, and then imprinted with postage corresponding to the weight of said pieces of mail, the method comprising the steps of:

a. continuously feeding in seriatim with a substantially vertical orientation, a quantity of mail along a continuous feed path;

b. continuously delivering in seriatim each piece of mail to a weighing station disposed along said feed path, for weighing said mail;

c. weighing each piece of mail delivered to said weighing station;

d. determining the amount of postage needed for each weighed piece of mail;

e. continuously delivering in seriatim each piece of weighed mail to a postage meter station disposed along said feed path;

f. controlling the amount of postage to be imprinted upon each piece of mail so that it corresponds with the amount of determined postage; and

g. imprinting each piece of mail delivered to said postage meter station with the controlled amount of postage.

3,877,532

LOW PROFILE SCALE

John D. Hale, St. Johnsbury, Vt., assignor to Colt Industries Operating Corporation, New York, N.Y.

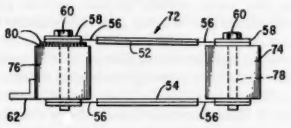
Filed Feb. 7, 1974, Ser. No. 440,329

Int. Cl. G01g *3/08*

U.S. Cl. 177—229 **21 Claims**

1. A low profile weighing assembly comprising scale platform means for receiving a load, support means spaced beneath said scale platform means, and parallelogram flexure linkage means operating to connect said scale platform means to said support means and to apply vertical forces induced by a load on said scale platform means to load sensing means, said parallelogram flexure linkage means including first and second spaced linkages positioned beneath said scale platform means, each such linkage including first and second elongated

beams arranged in spaced substantially parallel co-planar relationship and extending substantially parallel to said scale platform means, said first elongated beam being connected to said support means and said second elongated beam being connected to said scale platform means and flexure plate means secured to and extending between said first and second



elongated beams in substantially parallel relationship to said scale platform means and operating to offer low resistance to forces applied vertically to said scale platform means, said flexure plate means including vertically spaced upper and lower flexure plates extending in substantially parallel relationship between said first and second elongated beams.

3,877,533

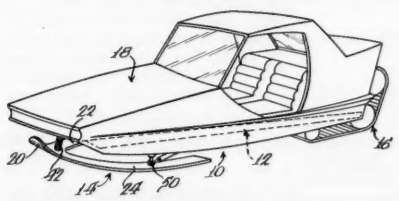
SNOWMOBILE STEERING MECHANISM

Joseph A. Maziarka, 7706 N. Oketo; Robert J. Maziarka, 8410 N. Cumberland, both of Niles, Ill. 60648, and Fredrick A. Johnson, 2915 Sunset Ave., Flossmoor, Ill. 60422

Filed Jan. 24, 1973, Ser. No. 326,381

Int. Cl. B62m *27/02*

U.S. Cl. 180—5 R **14 Claims**



1. In a snow vehicle having a frame means, a propelling means, a steering mechanism including ski means, improvement comprising: said ski means including a first and second skis, said skis being attached to each other rearwardly and forwardly, and means for raising or lowering said skis to effect turning of the vehicle.

3,877,534

SNOWMOBILE TRACK SUSPENSION SYSTEM

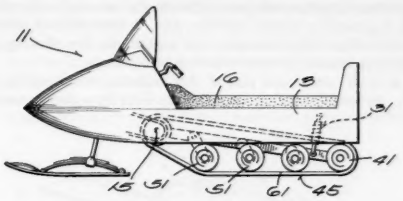
Thomas J. Krause, Menomonee Falls, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Mar. 26, 1973, Ser. No. 344,859

Int. Cl. B62m *27/02*

U.S. Cl. 180—5 R **5 Claims**

1. A snowmobile comprising a chassis, a drive shaft rotatably journalled by said chassis transversely thereof, a sprocket fixed on said drive shaft for common rotation therewith, a track suspension frame including a forward portion pivotally mounted from said chassis about the axis of said drive shaft and a rearward portion extending rigidly from said forward portion, resilient energy absorbing means extending between and connecting said rearward frame portion to said chassis to control pivotal movement of said track suspension frame relative to said chassis, an idler bogie supported from said rearward frame portion for rotation about a transverse axis, a plurality of intermediate bogies, means pivotally mounting said intermediate bogies from said track suspension frame in spaced relation to each other lengthwise of said track suspension frame for rotative movement independently of said track



suspension frame, and an endless belt trained around said sprocket wheel, said idler bogie, and said intermediate bogies.

3,877,535

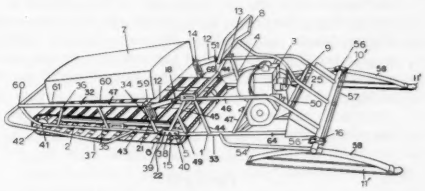
FLEXIBLE FRAME SNOWMOBILE

Raymond W. Gorski, 10355 Main St., Findley Lake, N.Y.

Filed Aug. 31, 1973, Ser. No. 393,313

Int. Cl. B62m *27/00*

U.S. Cl. 180—5 R **6 Claims**



1. A snowmobile comprising
a front frame,
a rear frame swingably connected to said front frame,
runners supported on spaced kir.g bolts on the front of said front frame,
a tie rod,
means connecting said tie rod to said king bolts,
a steering column,
means connecting said steering column to said tie rod,
first brackets having first slots fixed to said rear frame spaced from said pivotal connection,
and second brackets having second slots fixed to said front frame and spaced from said swingable connection,
a shock absorber member having a cylinder and a piston rod,
a pin attached to said cylinder and received in said first slot,
a pin attached to said piston rod and slidably received in said second slot whereby said front frame and said rear frame are swingable relative to each other,
a front axle on said front frame,
a rear axle on said rear frame,
a drive track supported on said axles,
an engine on said front frame,
and means drivably connecting said engine to said engine.

3,877,536

SNOWMOBILE ENGINE COOLING MEANS

Thomas E. Earhart, 3751 Patterson Rd., Shelbyville, Mich. 49344

Filed Dec. 5, 1973, Ser. No. 422,025

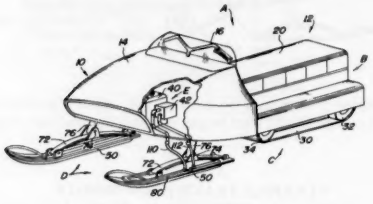
Int. Cl. B62m *27/02*

U.S. Cl. 180—5 R **18 Claims**

1. In a motorized snow vehicle including a frame; a traction means secured to said frame generally centrally thereof and supporting said frame; a pair of elongated skis each having a front lead section and a main body section with said skis

mounted beneath said frame adjacent the front portion thereof and movable between a normal position with said skis extending parallel to the longitudinal axis of said frame and positions angularly disposed thereto for steering said vehicle on a generally planar surface; and, a fluid cooled internal combustion engine secured to said frame for driving said traction means, the improvement comprising:

at least one of said pair of skis including a heat exchanger structure defining a continuous fluid flow path extending



longitudinally along a portion of the main body portion of said at least one ski, said heat exchanger including an exchanger inlet and an exchanger outlet adapted to be connected to the engine block cooling fluid outlet and the engine block cooling fluid inlet respectively wherein engine cooling fluid passing through said engine enters said exchanger inlet, travels through said exchanger discharging heat thereto collected from said engine and returns to said engine from said exchanger outlet for recycling therethrough.

3,877,537

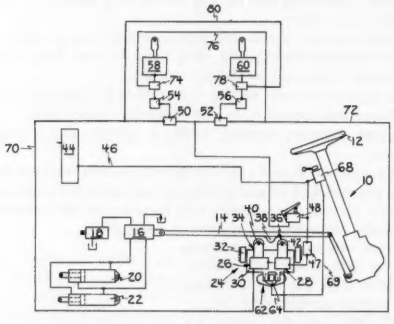
EMERGENCY STEERING BY WHEEL BRAKING ACTION

Edward J. Ohms, Washington; James M. Stanley, Oreana, and Lawrence F. Schexnayder, Joliet, all of Ill., assignors to Caterpillar Tractor Company, Peoria, Ill.

Filed Feb. 8, 1973, Ser. No. 330,518

Int. Cl. B62d *11/08*

U.S. Cl. 180—6.3 **10 Claims**



1. In a vehicle having a steering system comprising a steering device normally operable in one and the other directions to steer the vehicle, and brake means on either side of the vehicle actuatable by fluid pressure from a fluid pressure source, a vehicle emergency steering system comprising: valve means movable to a first position to be mechanically interengaged with the steering device for response to movement of the steering device in one direction to direct fluid pressure from the fluid pressure source to only the brake means of one side of the vehicle to brake-steer the vehicle in one direction, and for response to movement of the steering device in said other direction to direct fluid pressure from the fluid pressure source to only the brake means on the other side of the vehicle to brake-steer the vehicle in the other direction; said valve means being movable to a second position mechanically disengaged from the steering device so as to be non-responsive to movement of the steering device; and means operatively connected to said valve means for moving the valve means to said first and second positions, wherein the means for moving the valve means to said second position comprise resilient means which bias the valve means in said second position, and wherein the means for moving the valve means to said first position comprise manually actuatable means for so moving the valve means against the resiliency of the resilient means, wherein the means for moving the valve means to said first position further comprise cylinder means extendible upon application of fluid pressure thereto from the fluid pressure source, the manually actuatable means comprising a hand-actuated valve movable manually to direct fluid pressure from the fluid pressure source to the cylinder means to extend the cylinder means.

3,877,538

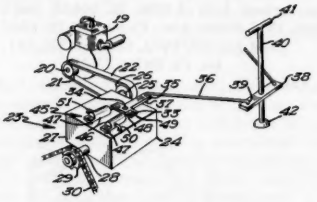
POWER ASSIST DEVICE FOR HYDROSTATIC DRIVE

Douglas W. Steiger, P.O. Box 5, St. Hilaire, Minn. 56701

Filed Jan. 28, 1974, Ser. No. 437,367

Int. Cl. B62d *11/04*

U.S. Cl. 180—6.48 **3 Claims**



1. In a hydrostatic drive device comprising:

a reversible rotary hydrostatic pump having a revolvable input shaft,

power means,

drive connections connecting the power means with said input shaft of the hydrostatic pump,

a rotary reversible hydrostatic motor having a revolvable output shaft,

means defining a pair of passages each being connected in communicating relation with the pump and the motor to permit hydraulic fluid to be circulated under pressure between the pump and the motor, the output shaft of the motor being revolved in a forward direction when the fluid is pumped from the pump through one passage to the motor and returned to the pump through the other passage, the output shaft of the motor being revolved in a reverse direction when a fluid is pumped from the pump through the other passage to the motor and returned to the pump through said one passage,

a manually operable shiftable elongate control lever being shiftable between forward, reverse and neutral positions, an actuating member connected with said pump and being shiftable between forward, reverse and neutral positions, said actuating member when in the forward position causing said output shaft of the motor to be driven in the forward direction, and when in the reverse position, causing said output shaft to be driven in a reverse direction, said actuating member when in the neutral position rendering said motor inoperative,

an elongate motion transmitting link having one end thereof connected to said control lever and having the other end thereof connected with said actuating member,

a pair of hydraulic extensible and retractable ram devices mounted adjacent said pump and each being connected

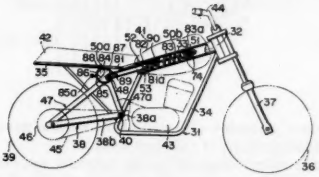
to said actuating member, each ram including a cylinder and piston and being connected in a communicating relation with one of said passages, each of said rams being extended in response to the flow of fluid under pressure from the pump through the associated passage to thereby assist shifting movement of said control lever.

3,877,539

MOTORCYCLE SHOCK ABSORBING REAR FORK SUSPENSION

Lucien Tilkens, Brustem, Belgium, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata-shi, Shizuoka-ken, Japan

Filed Apr. 3, 1973, Ser. No. 347,475
Claims priority, application Belgium, Apr. 5, 1972, 115959
Int. Cl. B62d *61/02*; **B62k** *19/00*
U.S. Cl. 180—32 **22 Claims**



1. A motorcycle comprising:
a. a main frame having a steering head and a tank rail extending rearward from said steering head;
b. a rear fork having a forward end portion pivoted to the rear lower portion of said main frame;
c. a fuel tank having an inverted generally U-shaped cross-section and straddling said tank rail;
d. a pair of triangular subframes;
e. supporting means mounted on said rear fork and connected to the base sides of said pair of triangular subframes; and
f. hydraulic shock absorbing means extending along said tank rail so as to be mostly covered with said fuel tank, said shock absorbing means comprising:
i. a oil damper comprising a cylinder filled with damping oil and a piston rod telescopically projecting from one end of said cylinder, one of said cylinder and said piston rod being connected to said main frame at a portion a little rearward of said steering head and the other of said cylinder and piston rod being pivotally mounted to the upper portions of said pair of triangular subframes; and
ii. a gas tight container, the interior of which is divided by a movable member into two chambers, one of said chambers communicating with the interior of said cylinder and the other chamber being filled with compressed gas exerting pressure on the damping oil, thereby causing said compressed gas to urge said rear fork downward.

3,877,540

POWER STEERING SYSTEM HAVING A VARYING RESISTANCE RESPONSIVE TO RUNNING SPEED

Naosuke Masuda; Yoshiyuki Shimoura, both of Higarshimatsuyama, and Hideo Konishi, Saitama, all of Japan, assignors to Jidosha Kiki Kabushiki Kaisha, Tokyo, Japan

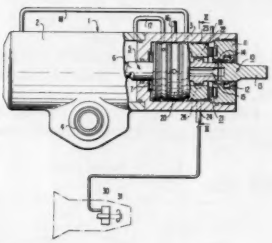
Filed Oct. 19, 1973, Ser. No. 408,019
Claims priority, application Japan, Feb. 2, 1973, 48-13467
Int. Cl. B62d *5/08*
U.S. Cl. 180—79.2 R **4 Claims**

1. In a power steering system having a rotary control valve adapted for regulating a first working fluid upon angular displacement between concentric, radially inner, input and radially outer, output members, so as to control the operation of a hydraulic motor; the improvement comprising:

an annular groove formed in a portion of the outer peripheral surface of said output member for receiving a second working fluid of a pressure controlled in response to the speed of the vehicle on which the power steering apparatus is mounted,

opposed pairs of plunger bores formed within the output member and extending inwardly from said annular groove towards each other,

diametrically opposed radial recesses formed within the inner periphery of the output member and intersecting



respective pairs of bores and forming therewith an abutment member defining the inner ends of respective bores, projections extending diametrically from the outer periphery of the input member and disposed within respective recesses within the inner periphery of said output member, and

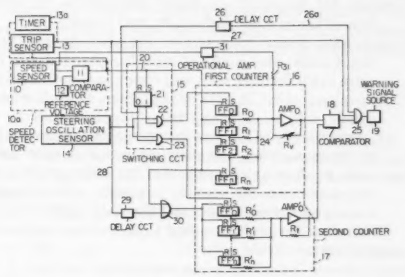
plungers slidably positioned within each of the plunger bores with said plungers abutting said abutment and respective sides of said projections when said valve is in its neutral position.

3,877,541

ELECTRONIC SAFETY ASSURANCE SYSTEM FOR AN AUTOMOTIVE VEHICLE

Yasuhisa Takeuchi, Yokosuka, and Takayuki Yanagishima, Yokohama, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Jan. 31, 1974, Ser. No. 438,363
Claims priority, application Japan, Feb. 3, 1973, 48-13394
Int. Cl. B60k *27/08*
U.S. Cl. 180—99 **9 Claims**



1. In a safety apparatus for a vehicle having a steering wheel in which a series of pulses is produced in response to oscillatory movement of said steering wheel and counted for comparison with a reference count to give a warning signal, the improvement comprising:
a. speed sensing means for producing a first signal when the speed of said vehicle exceeds a preselected value;
b. means responsive to said first signal for producing a second signal at a preselected interval;

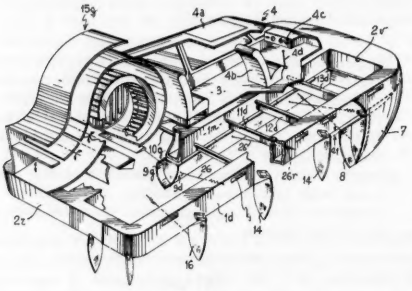
c. first storage means responsive to said first signal for counting said series of pulses to establish said reference count during the initial period of a given run length;
d. second storage means responsive to said first and second signals for counting said series of pulses to repeatedly establish a second count during the remaining period of said run length;
e. means responsive to said second signal for comparing said second signal with said reference count to produce an output when said second count is smaller than said reference count; and
f. means responsive to said output for giving said warning signal to alert the driver in said vehicle.

3,877,542

VEHICLE WITH AN AIR CUSHION LIFTING SYSTEM

Charles Lucien Paoli, Groupe Scolaire Albert Camus, Port Marly 78, France

Filed Mar. 17, 1972, Ser. No. 235,519
Claims priority, application France, Apr. 23, 1971, 71.14537
Int. Cl. B60v *1/00*
U.S. Cl. 180—120 **23 Claims**



1. An air-cushion vehicle, comprising:
A platform equipped with flexible bands forming skirts, and particularly a continuous peripheral skirt said peripheral skirt comprising an outer band attached to said platform; an inner band spaced from said outer band at its upper edge and attached to said outer band at spaced intervals by vertically flexible bracing panels, said inner band being fixed at intervals to said platform by suspension means and cables,
means for supplying air under pressure to the cushion formed under said platform by said bands;
propulsion devices mounted on said platform, said flexible bands under the platform being longitudinal and transverse skirts forming with said bands and particularly said peripheral skirts, at least two chambers extending longitudinally side by side and being supplied with air each independently of the other chamber, said chambers being in communication with each other, the skirts of said air cushion allowing circulation of air under pressure from one chamber to the next for generating a force couple to restore said vehicle to a predetermined equilibrium position after having been rolled to an inclined position during motion of said vehicle.

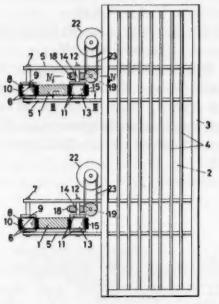
3,877,543

SCAFFOLDING FOR BUILDING

Tadashi Iwata, 2472 Oaza Kanokami Kano-cho, Yamaguchi-ken, Japan

Filed May 22, 1974, Ser. No. 472,304
Int. Cl. A63b *27/00*
U.S. Cl. 182—133 **6 Claims**

1. A scaffolding for building including a plurality of posts disposed in the vertical direction and a horizontal platform mounted to said posts so as to be freely moved up and down along the posts, characterized in that said scaffolding comprises:
A. arm levers having their one end portions coupled to said platform and the other end portions extended towards said posts, said extended portions being inclined upwardly with respect to the horizontal direction at an angle;



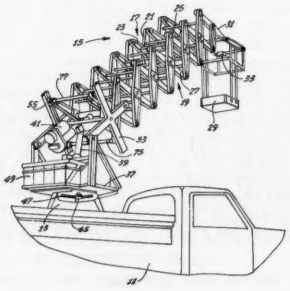
B. rollers pivotably mounted at the extremities of said extended portions of said arm levers;
C. drive rollers disposed on the opposite sides of the posts to said rollers and pivotably mounted on said arm levers;
D. worm wheels provided on the same shafts as said drive rollers; and
E. worms coupled to a prime motor on one hand and meshed with said worm wheels on the other hand.

3,877,544

STRESS BALANCED EXTENDIBLE BOOM STRUCTURE

Fenwick Harris McCollum, Los Angeles, Calif., assignor to Del Mar Engineering Laboratories, Los Angeles, Calif.

Continuation of Ser. No. 189,361, Oct. 14, 1971. This application July 13, 1973, Ser. No. 379,097
Int. Cl. B66f *11/04*
U.S. Cl. 182—141 **11 Claims**



1. A boom for locating a basket suspended from the end thereof at a predetermined position in which an asymmetrical load may be applied to said boom comprising
a pair of lazy tongs arranged in parallel relationship, each including
a plurality of bays comprising
an inner beam,
an outer beam,
means near the centers of said inner and outer beams for pivotally connecting them together,
means interconnecting said pair of lazy tongs to prohibit rotation of said boom about the central axis thereof when

an asymmetrical load is applied thereto by said basket, which load tends to extend one of said lazy tongs and retract the other comprising

first torsion transmitting means fixed between the inner beams in each bay intermediate and pivot connection means and each end thereof and

second torsion transmitting means fixed between the outer beams in each bay intermediate said pivot connection means and each end thereof, said first and second torsion transmitting means being so constructed as to have equal torsional spring rates, and

means at the outermost bay for supporting and mounting a basket thereon.

3,877,545

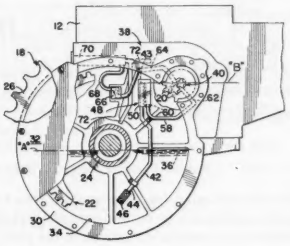
LUBRICATION SYSTEM FOR VEHICLE FINAL DRIVE

Robert S. Orr, Pekin, Ill., assignor to Caterpillar Tractor Company, Peoria, Ill.

Filed Jan. 26, 1973, Ser. No. 327,093

Int. Cl. F01m *9/00*

U.S. Cl. 184—6.3 **8 Claims**



1. A lubrication system comprising:

a supply of lubricating liquid;

a first line having a first end in communication with the supply of lubricating liquid and extending upwardly therefrom to a second end;

reservoir means comprising a reservoir body, the second end of the first line extending into the reservoir body for communication therewith;

a second line having a first end extending into the reservoir body for communication therewith, the first end of the second line being at a lesser height than the second end of the first line, the second line having a second end extending outwardly of the reservoir body;

a reversibly operated fluid pump connected to the second end of the second line and capable of pumping fluid through the second line to and from the reservoir body; whereby upon actuation of the pump to pump fluid from the reservoir body through the second line, lubricating liquid is drawn through the first line, into the reservoir body, through the second line and through the pump, to an area to be lubricated, and whereby, upon actuation of the pump to pump fluid to the reservoir body through the second line, lubricating liquid is pumped through the second line, into the reservoir body, up to the level of the second end of the first line, and through the first line, and air may be pumped through the second line into the reservoir body, and through the first line;

the greater height of the second end of the first line as compared to the first end of the second line insuring that, when fluid is pumped through the second line into the reservoir body, the level of liquid in the reservoir body remains substantially at the level of the second end of the first line.

3,877,546

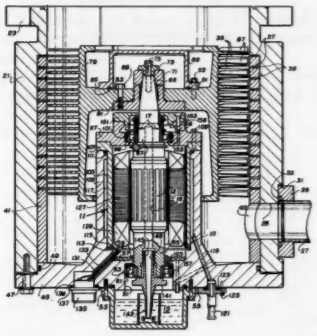
LUBRICATION SYSTEM FOR VERTICAL SPINDLE MOTOR

Robert L. Shrader, Castro Valley, Calif., assignor to Airco, Inc., New York, N.Y.

Filed Apr. 12, 1973, Ser. No. 350,316

Int. Cl. F16n *7/18*

U.S. Cl. 184—6.18 **2 Claims**



1. In a motor having a substantially vertical spindle with a bearing toward the upper end thereof and incorporating cooling means for the winding of said motor, a lubrication system which is also a cooling system for enabling operation of said motor in a vacuum, comprising, means defining a lubricant reservoir at the lower end of said spindle, a passage in said spindle extending along the axis thereof and having at least a portion of increasing diameter upwardly to cause conduction of lubricant upwardly along its length by centrifugal force, said passage communicating with said reservoir at the lower end of said spindle and said portion of increasing diameter, said portion of said passage in said spindle being of sufficient size and diameter increase to provide a lubricant flow substantially greater than that necessary to lubricate said bearing, said lubricant flow thereby serving as a coolant for said spindle, outlet means extending radially at the upper end of said spindle to provide communication from said passage to the outer surface of said spindle above said bearing, means for receiving lubricant emanating from said outlet means and for directing only the amount of lubricant necessary for proper lubrication to said bearing, and means defining a return path to said reservoir for lubricant received by said receiving means, said return path defining means having at least a portion located in thermal proximity to said cooling means for said motor winding.

3,877,547

OIL MIST LUBRICATING SYSTEM FOR MACHINES

Werner Willuweit, St. Clair Shores, and Terence D. Jordan, East Detroit, both of Mich., assignors to F. Jos. Lamb Company, Warren, Mich.

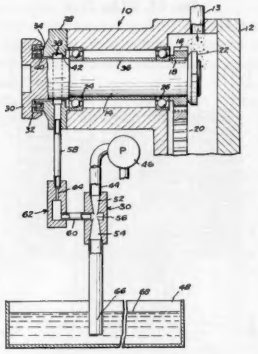
Filed June 29, 1973, Ser. No. 374,961

Int. Cl. F16n *7/32*

U.S. Cl. 184—6.26 **3 Claims**

1. A machine having a housing enclosing movable parts including, means for introducing a pressurized oil mist-air mixture into the housing to lubricate said moving parts, a first conduit having an inlet connected with the housing and communicating with the interior thereof, a second conduit conducting pressurized liquid having a specific gravity different from that of the oil, said second conduit having an aspirating means therein, said first conduit having an outlet connected to said aspirating means so that the outlet is subjected to the reduced pressure created by said aspirating means whereby to create a pressure differential between the inlet and the outlet

of the first conduit which causes the oil mist-air mixture in the housing to be discharged therefrom through said first conduit,



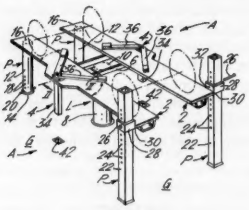
the second conduit having an outlet communicating with a reservoir means from which the entrained air from the housing is adapted to escape.

3,877,548

CAR HOIST

Stanley Hernick, 71 Westgate Blvd., Downsview, Ontario, Canada

Filed Jan. 2, 1974, Ser. No. 429,530
Int. Cl. B66f 7/18
U.S. Cl. 187—8.43 **14 Claims**



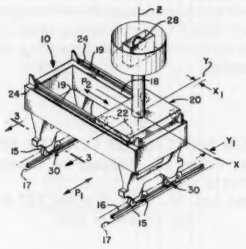
1. A vehicle hoist comprising:
runways on which a vehicle is disposable for lifting and lowering thereby, said runways being spaced apart to accommodate the wheels of the vehicle;
lift mechanism disengageably engageable with said runways and operable to lift and lower them as aforesaid through a range of elevations;
props for temporarily propping said runways at selected elevations within said range, and
a jack carried by each said runway disengageably engageable by said lift mechanism and thereby operable, when the runways are propped as aforesaid and said lift mechanism is disengaged from the runways, to raise and lower the vehicle relative to the runways at any elevation at which they may be propped.

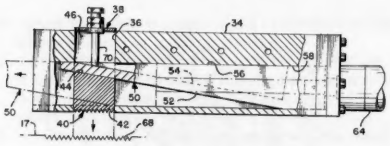
3,877,549

RESTRAINT APPARATUS FOR A MOBILE STRUCTURE

Charles W. Clark, Jr., Seattle, Wash., assignor to Ederer Incorporated, Seattle, Wash.

Filed June 4, 1973, Ser. No. 366,628
Int. Cl. B61h 7/12
U.S. Cl. 188—38 **10 Claims**





1. Restraint apparatus for large mobile structures movable along a path and having to be temporarily locked in both the longitudinal and transverse directions in the path, comprising: a mobile structure having rotatable support members, means for supporting the rotatable support members along said path, fixed anchoring means along said path and spaced from a rotatable support member supporting means, and means for wedging and clamping the mobile structure to the fixed anchoring means for positively locking the mobile structure in both the transverse and longitudinal directions, regardless of the position of the mobile structure relative to said supporting means, said wedging and clamping means including a movable main wedge, said anchoring means including a first set of surfaces extending generally transversely of said path, said wedging and clamping means including a second set of generally transversely extending surfaces coupled to said mobile structure and movable into and held in overlapping engagement with said first set of surfaces by movement of said movable main wedge, with the wedge precluding movement of said second set of surfaces laterally of the path and locking means precluding movement of said second set of surfaces longitudinally along said path.

3,877,550

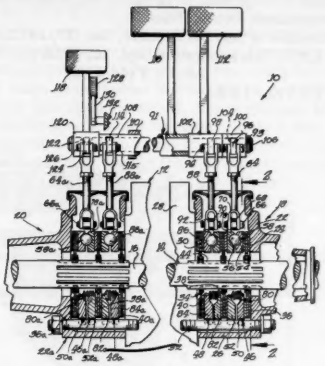
COMBINATION SERVICE AND PARKING BRAKE

Emil H. Hahn, St. Joseph, Mich., assignor to Lambert Brake Corporation, St. Joseph, Mich.

Filed Jan. 31, 1974, Ser. No. 438,374
Int. Cl. F16d 65/14
U.S. Cl. 188—106 P **7 Claims**

1. A combination service and parking brake for a machine having a rotatable member comprising rotor disc means connectable with said rotatable member, stator disc means including first and second actuating disc means for actuating the entire rotor disc means for energizing the brake structure, said rotor disc means including a rotor disc disposed between and engageable with both of said first and second actuating disc

assemblies, a first actuating member for actuating said first actuating disc means during service operation of the machine,



and a second actuating member for actuating said second actuating disc means during parking.

3,877,551

BRAKE DISK FOR A RAILWAY VEHICLE WHEEL

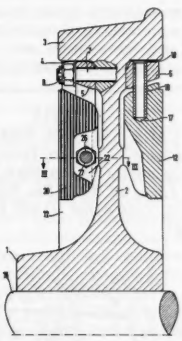
Hans Gebhardt; Franz Prahl, both of Munich, and Corneliu Popescu, Lohhof, all of Germany, assignors to Knorr-Bremse GmbH, Munich, Germany

Filed Sept. 17, 1973, Ser. No. 397,580

Claims priority, application Germany, Sept. 22, 1972, 2246517

Int. Cl. F16d *65/10*

U.S. Cl. 188—218 XL **6 Claims**



1. A brake disk for a railway vehicle wheel comprising a rim and a disk portion, a brake disk supporting ring positioned coaxially on said disk portion of said railway vehicle wheel, said supporting ring being securely mounted on said railway vehicle wheel radially inwardly of said wheel rim thereof, a brake disk ring being spaced slightly radially inwardly of said supporting ring, means mounting said supporting ring to said brake disk ring, said brake disk ring consisting of two half-rings, said half-rings each having a plane surface directed away from the wheel and a recess opening in the ends of said half-rings on the side of said brake disk ring directed toward said disk portion of the wheel, there being a plurality of radially extending notches and indentations on each end of said half-rings, said notches on the ends of one half-ring mating with the indentations on the ends of the other half-ring such that the plane surfaces of both half-rings lie in the same plane, and bolt means, received in said recess opening, interconnecting the mating ends of said half-rings, said bolt means passing perpendicularly through a plane of separation defined by the ends of said half-rings and retaining said half-rings together.

3,877,552

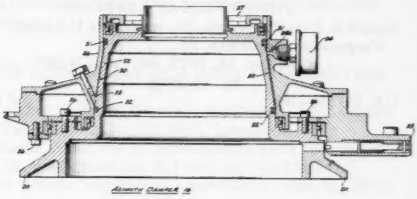
HIGHLY VISCOUS FLUID DAMPER PROVIDING REGULATED NON-LINEAR DAMPING FOR TRAVERSING UNITS

Howard P. Higginson, and Robert P. Mack, both of Los Angeles, Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Continuation of Ser. No. 48,787, June 19, 1970, abandoned. This application Mar. 22, 1973, Ser. No. 343,780

Int. Cl. F16d *57/00*

U.S. Cl. 188—268 **16 Claims**



1. A traversing unit comprising:

pivot means for providing at least two degrees of movement about azimuth and elevation axes for traversing operations about said axes including movement over a range of traversing rates during operation of the traversing unit;

fluid damper means for respective axes coupled to said pivot means for producing non-linear dampening of said movement about said axes over the range of traversing rates;

said damper means comprising annular sections having spaced, opposing annular surfaces defining a gap and disposed for relative movement including one of said sections which is coupled to said pivot means to be movable therewith to produce relative movement at a rate which is a function of said traversing rates;

said damper means including a highly viscous fluid disposed in the gap between said sections and engaging the opposing surfaces of the damper to produce shear in said fluid in the range of traverse rates for damping resistance to relative movement, said highly viscous fluid at the desired high viscosity and in the range of traversing rates exhibiting a non-Newtonian characteristic including repeatedly exhibiting a substantial reduction in apparent viscosity in the intermediate and higher traversing rates of the range on each traversing operation exceeding predetermined rates of shear to limit the damping resistance wherein the degree of said reduction in apparent viscosity and limiting of damping resistance is determined by the non-Newtonian characteristic of the fluid at the desired high viscosity thereof, said damper means being constructed and arranged to utilize the substantial reduction in apparent viscosity provided by the non-Newtonian characteristic of the highly viscous fluid in the gap by producing relative movement of said opposing surfaces including relative movement below and above said predetermined shear rates within the range of traversing rates of the traversing unit to produce non-linearity in damping resistance while maintaining a stable area of fluid contact with the opposing annular surfaces of the sections forming the gap for producing a substantial decreasing rate of damping resistance to higher rates of movement producing relative movement of said opposing surfaces above said predetermined shear rates in the upper range of traversing rates in the operation of said unit wherein said fluid

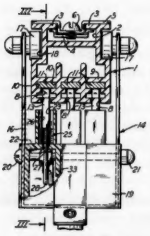
is made responsive to relative movement of said annular sections in the range of shear rates to produce shear stresses in the fluid for non-linear damping resistance over the range of traversing rates for damping of movement of said pivot means about said axis as a function of rate of movement so that the resistance to movement is substantially limited to below a predetermined torque applied to said pivot means for facilitating relative movement exceeding a predetermined desired traversing rate in said range while maintaining damping resistance below said predetermined desired traversing rate for substantial damping of movement of the traversing unit in the lower range of operation thereof.

3,877,553

ELECTRIC POWER DISTRIBUTION SYSTEM WITH POWER PICK-UP CARRIAGE

Donald R. Ross, Pittsburgh, Pa., assignor to U-S Safety Trolley Corporation, Pittsburgh, Pa.

Filed Dec. 14, 1973, Ser. No. 424,655
Int. Cl. B60l *5/38*
U.S. Cl. 191—49 **5 Claims**



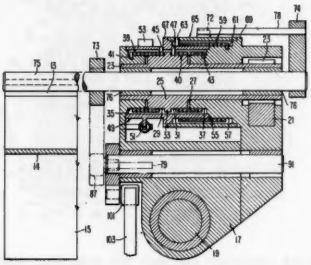
1. In an electric power distribution system, the combination with a hollow overhead rail containing parallel electrical conductors extending lengthwise thereof and having exposed lower surfaces, said rail being formed from a plurality of sections disposed end to end with expansion gaps between the ends of adjacent sections, of an electrical power pick-up carriage comprising a channel-like frame having a bottom wall below said rail and a pair of laterally spaced side walls extending upwardly beside the opposite sides of the rail, a row of at least four wheels along the inner surface of each side wall running on the rail, means rotatably connecting the wheels to said frame to support it from the wheels for smooth travel of said carriage across said gaps from one rail section to another, an insulating housing disposed in said frame below the rail, removable means normally holding said housing in said frame, the upper part of housing having upwardly opening sockets therein, an electric contact member in each of said sockets slidable vertically therein and projecting above the housing into engagement with one of said conductors, springs in the housing urging the contact members upwardly, flexible wires in the housing secured to the contact members and extending downwardly therefrom, terminal means fastening the lower ends of the wires to the housing, the bottom wall of said frame having an opening therethrough for an electrical conductor, and means for fastening such a conductor to said terminal means.

3,877,554

BIDIRECTIONAL SPRING CLUTCH HAVING MEANS TO INHIBIT AUTOMATIC SHIFTING

Edward A. Wojtowicz, Bryn Mawr, Pa., assignor to Burroughs Corporation, Detroit, Mich.

Division of Ser. No. 319,091, Dec. 27, 1972, Pat. No. 3,813,953. This application Sept. 26, 1973, Ser. No. 400,956
Int. Cl. F16d *67/02*
U.S. Cl. 192—12 BA **5 Claims**



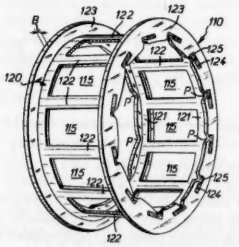
1. A spring clutch comprising:
an output member;
an input member rotable with respect to said output member, said output member and said input member having a pair of aligned surfaces of circular cross section;
spring drive means coiled around said pair of aligned surfaces for transmitting unidirectional force from said input member to said output member;
sleeve means rotatably journalled on said output member for controlling the engagement of said spring drive means with said pair of aligned surfaces of said input and output members;
spring brake means coiled around the outside of said sleeve means and a portion of said output member for inhibiting rotation of said sleeve means; and
means for engaging and disengaging said brake means.

3,877,555

ASSEMBLY CAGE FOR FREE-WHEEL OR BEARING

Michel Rist, Boulogne-Billancourt, France, assignor to Societe Anonyme Francaise Du Ferodo, Paris, France

File l June 22, 1973, Ser. No. 372,615
Int. Cl. F16d *41/06, 15/00;* **F16c** *33/46*
U.S. Cl. 192—43 **4 Claims**



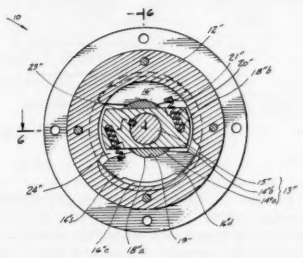
1. An assembly cage for the jamming devices of a one-way coupling or free-wheel device, comprising two coaxial tracks, a said cage extending between said tracks and having a generally cylindrical form with a series of windows in which said devices are housed, said assembly cage further comprising two annular end-plates, bracing means which interconnect said end-plates and which define said circular series of windows, said bracing means having terminal portions including means

for their assembly on said end-plates, the last-named means comprising at least one dove-tail engaged in an opening formed in each said plate, said opening being larger than the section of said terminal portion, said end-plates being radially deformed at the level of said openings, on at least one side of said dove-tails, thereby to fix together said assembly, said bracing means comprising a member in the form of a flat ladder comprising upright members and rungs, and rolled into a cylindrical shape, said ladder having lateral projections which constitute said assembly means, said projections being engaged in slots formed in said end-plates, in which they are held fixed, each said projection having the form of a trapezium with a large external base smaller than the said slot so as to leave a space when the projection is engaged therein.

3,877,556
SILENT RATCHET

Philip J. Brownscombe, 1539 Long Hill Rd., Millington, N.J. 07946

Filed Sept. 28, 1973, Ser. No. 401,897
Int. Cl. F16d *41/06*
U.S. Cl. 192—45.1 **3 Claims**

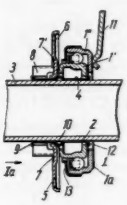


1. A silent ratchet device comprising in combination: a first structure having an inner periphery defining in a first plane a circular space; cam means mounted concentrically within said space and having spaced-apart radially-outwardly-projecting first circumscribing-convex-surfaces, the first convex-surfaces extending along different sectors of the circular space in common directions around a substantially common point substantially centrally of the cam means; at least one of said first structure and said cam means being pivotably-rotatably concentrically mounted relative to the other in a plane substantially parallel to said first plane; eccentric pawl means mounted slidably within said space between and movably slidable-along each of said first surfaces of said cam means and said first structure's inner periphery, mounted slidably substantially along said first plane, and having a plurality of angularly spaced-apart eccentric pawl portions, for each said radially projecting circumscribing convex-surface there being a matchingly positioned pawl portion of the pawl means, each pawl portion having a radially-outwardly-facing periphery defining a second convex-surface of a radius substantially identical to that of the circular-space-defining first structure's inner periphery, and each pawl portion having a radially-inwardly-facing periphery defining a concave-surface of a radius substantially identical to that of said first convex surface, the arc of said concave-surface being eccentric to the arc of said second convex-surface and the arcs of said first convex-surfaces having centers respectively off-set from said cam means center such that with regard to potential rotary movement of one relative to the other of the first structure and the cam means, the pawl portions acting coordinately offset pressures of one-another while concurrently braking against rotation in one of clockwise and counter-clockwise rotation and permitting rotation in the other of clockwise and counter-clockwise rotation; and spring means mounted on one of said eccentric pawl means and said cam means, and the spring means being biased-against said pawl means such that each said pawl portion is biased in an engaging-direction and such that the biased-pawl portion is spring-biased into friction-contact with each of said inner periphery of said first structure and said first surface of said cam means, the pawl portions being separate from one-another, each said second convex-surface of each pawl portion including two spaced-apart radially-outwardly-facing contact surfaces; and an intermediate cam portion and at-least two separate spaced-apart cam portions located along different circumscribing surfaces of the intermediate cam portion, and different ones of said first convex surfaces of the cam means being respectively outer convex surfaces of the spaced-apart cam portions and each spaced-apart cam portion including a lineally-extending slide-surface and the intermediate cam portion including lineally-extending slide-surfaces, there being one cam-portion lineally-extending slide surface matched with each spaced-apart cam-portion lineally-extending slide-surface, such that each spaced-apart cam portion is slidable to and fro for proper flush alignment of its outwardly-facing first convex-surface with aligning movement to the pawl portion matched therewith.

3,877,557
CLUTCH BEARING HAVING RADIAL AND AXIAL FREE PLAY

Paul Maucher, Sasbach, Germany, assignor to Luk Lamellen Und Kupplungsbay GmbH, Buhl, Germany

Continuation of Ser. No. 157,436, June 28, 1971, abandoned.
This application Jan. 8, 1974, Ser. No. 431,662
Claims priority, application Luxembourg, June 26, 1970, 61202
Int. Cl. F16d *23/14*
U.S. Cl. 192—98 **18 Claims**



1. Disengaging member for a clutch or the like comprising a sliding sleeve formed with a bore, a bearing mounted on said sliding sleeve and including a revolving race and a non-revolving race, stop means for limiting axial movement of said non-revolving race with respect to said sliding sleeve, said revolving race having contact surfaces for engagement by radially extending disengaging elements of a clutch, and retaining means effective in axial direction of said sliding sleeve for ensuring retention of said bearing on said sliding sleeve, said retaining means being disposed in a position relative to said stop means to provide axial and unbiased free play of said bearing on said sliding sleeve, and said bearing having an inner race having a diameter greater than at least a portion of said sliding sleeve to provide radial free play of said bearing on said sliding sleeve.

3,877,558
CLUTCH RELEASE BEARING ASSEMBLY

Nariaki Endo, Osaka, Japan, assignor to Koyo Seiko Company, Limited, Osaka, Japan

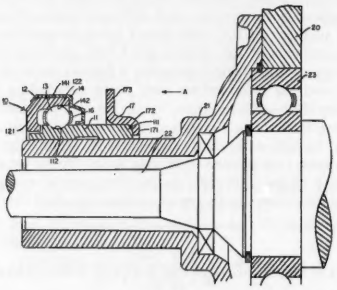
Filed Jan. 23, 1973, Ser. No. 326,088
Claims priority, application Japan, Jan. 24, 1972, 47-10224
Int. Cl. F16d *19/00, 23/12*
U.S. Cl. 192—98 **6 Claims**

1. A clutch release bearing assembly disposed about a shaft for axial movement along said shaft, said assembly comprising: an outer race ring having a first side;

an inner race ring having an inner surface disposed directly about said shaft, an outer surface, and an extension of

said inner race ring extending axially away from said firt side to an end;

a flange member spaced apart from said shaft fixed to said inner race ring extension end, said flange member having an irregular shape including a cylindrical portion extending along said inner race extension outer surface from



said inner race end, a portion extending radially inwardly from said cylindrical portion along said inner race end, and a portion extending radially outwardly to a free edge from said cylindrical portion opposite said race end; and, a plurality of balls interposed between said inner and outer race rings.

3,877,559

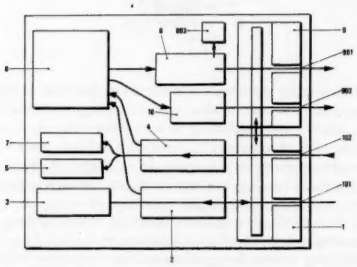
APPARATUS FOR DISPENSING BANK NOTES

Gerard Burgin, 6, rue de la Thur, Kingersheim, France

Filed Feb. 2, 1973, Ser. No. 328,936

Int. Cl. G07f *11/00*

U.S. Cl. 194—4 G **10 Claims**



1. Apparatus for dispensing bank notes on presentation of a bank identity card and a cheque on which the amount corresponds to the value of the notes requested, said apparatus comprising:

a bank note dispenser,

means for verifying the authenticity of the bank identity card introduced into the apparatus by the user,

means for verifying the authenticity of a cheque introduced into the apparatus by the user,

means for verifying agreement between the identification marks on the bank identity card and the identification marks on the cheque,

a logic control means receiving the signals supplied respectively by the means for verifying the authenticity of the identity card, the means for verifying the authenticity of the cheque and the means for veryifying agreement, said logic control means controlling the note dispenser in accordance with the information it has received,

in which the means for verifying the authenticity of the bank identity card and the means for verifying the authenticity of the bank cheque respectively include a positioning device for positioning the identity card and the cheque in vertical position, edgewise, for examination,

and in which the means for verifying the card and the means for verifying the cheque comprise a common means for reading comprising reading heads integral with a horizontal rotary shaft whereby the reading heads may be presented alternatively to the card and the cheque in order to verify the cheque and the card separately.

3,877,560

PAPER GUIDE FOR A COMPACT FLYING PRINTER

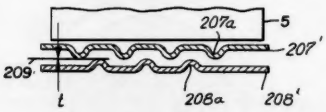
Tadayoshi Shimodaira, Suwa, and Yoshifumi Gomi, Chino, both of Japan, assignors to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Division of Ser. No. 118,427, Feb. 24, 1971, Pat. No. 3,795,185. This application Apr. 28, 1972, Ser. No. 248,369

Claims priority, application Japan, Feb. 27, 1970, 45-16451

Int. Cl. B41j *15/00*

U.S. Cl. 197—133 R **1 Claim**



1. In a compact flying printer, the improvement in a guide for print paper which comprises an upper paper guide and a lower paper guide in spaced overlapping relation to said upper paper guide for the passage of said print paper therebetween, each of said upper and lower paper guides being formed with at least one rib extending along the surface thereof facing the other of said upper and lower paper guides substantially in the direction of displacement of said print paper, the ribs on each of the upper and lower paper guides projecting toward the other of said upper and lower paper guides and terminating at outer ends facing the other of said upper and lower paper guides, the ribs on the respective upper and lower paper guides being out of overlapping relation and dimensioned to define a gap between the outer ends of the ribs of said upper paper guide and the outer ends of the ribs of said lower paper guide measured in a direction substantially normal to said upper and lower paper guides, said gap being substantially equal to the thickness of said print paper for receipt of said print paper, whereby the respective ribs of each of said upper and lower paper guides do not project beyond the outer ends of the ribs on the other of said upper and lower paper guides.

3,877,561

CARTRIDGE FOR THE CARBON RIBBON OF A TYPEWRITER, CALCULATING MACHINE, ACCOUNTING MACHINE OR LIKE OFFICE MACHINES

Gianpaolo Guerrini, Ivrea, and Giuseppe Oddicini, Banchette, both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Torino, Italy

Filed Sept. 27, 1972, Ser. No. 292,597

Claims priority, application Italy, Apr. 2, 1973, 942662/73

Int. Cl. B41j *33/14*

U.S. Cl. 197—151 **6 Claims**

1. A carbon ribbon cartridge removably mounted on a feed device of a typewriter, calculating machine, accounting machine or other office machines including a motive shaft, a first feed roller, and a second feed roller movable from a position wherein said first and said second feed rollers are separated by a gap to another position wherein said second feed roller pinches a carbon ribbon against said feed roller for feeding said carbon ribbon,

said cartridge comprising:

a container of substantially parallelepipedal form and having a bottom portion and a top portion;

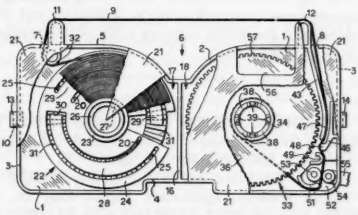
a feed spool on which said carbon ribbon is normally wound;

a take-up spool for receiving said carbon ribbon;

means for rotatably supporting said feed spool and said take-up spool in said container between said bottom and said top portions;

a first aperture in said container, said carbon ribbon extending through said first aperture to the exterior of said container;

a second aperture in said container, said carbon ribbon returning to the interior of said container through said second aperture, said first and said second apertures being adjacent said feed spool and said take-up spool respectively;



a third aperture in said bottom portion enabling said motive shaft to enter in said container so as to drive said take-up spool for receiving said carbon ribbon;

an opening at said bottom portion of said container, said opening being arranged in the proximity of said take-up spool so as to receive said first and said second feed rollers for pulling said carbon ribbon toward said take-up spool;

first guide means of said container disposed between said second aperture and said opening for checking said carbon ribbon from said second aperture to said opening; and

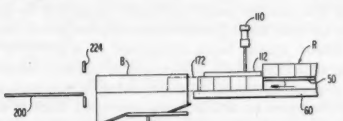
second guide means of said container disposed between said opening and said take-up spool for checking said carbon ribbon from said opening to said take-up spool so as to cause said carbon ribbon to pass over said opening along a path included on said gap.

3,877,562

ARTICLE PACKAGING MACHINE

Jesse B. Shaw, East Paterson, N.J., assignor to Marcal Paper Mills, Inc., East Paterson, N.J.

Filed May 19, 1972, Ser. No. 254,989
Int. Cl. B65g *47/00*
U.S. Cl. 198—24 **11 Claims**



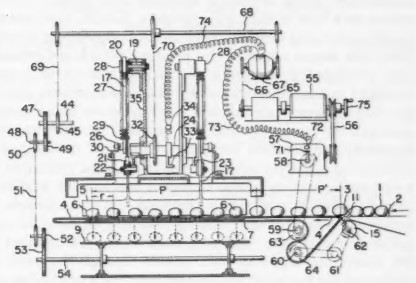
1. An article packaging assembly including means for supporting a receptacle, and article transfer means for forwarding articles thereto, said article transfer means comprising: arm means mounted for horizontal reciprocal movement and including a supporting surface and a pushing surface; conveyor means for advancing a continuous column of articles horizontally along said supporting surface in the general direction of said receptacle; power means for reciprocating said arm means; means automatically actuable in response to a predetermined advancement of said column of articles on said supporting surface to: activate said power means for retracting said arm means rearwardly from beneath a selected quantity of said articles to cause said selected quantity of articles to be displaced downwardly, and activate said power means for advancing said arm means forwardly subsequent to downward displacement of said selected quantity of articles to bring said pushing surface into pressure engagement with the rearward-most one of said selected quantity of articles in a manner to effect forward movement of said selected quantity of articles toward said receptacle, and means movable into the path of the column of articles upon downward displacement of said selected quantity thereof during the subsequent advancement of the arm means to push the selected quantity of articles toward the receptacle for stopping forward movement of said column.

3,877,563

AUTOMATED TRANSFER APPARATUS

Torahiko Hayashi, 2-3 Nozawa-cho, Utsunomiya, Japan

Filed Sept. 13, 1972, Ser. No. 288,642
Claims priority, application Japan, Sept. 14, 1971, 46-71520
Int. Cl. B65g *47/26*
U.S. Cl. 198—31 AB **4 Claims**



1. An automated apparatus for transferring a plurality of confectionery, bread or similar materials from a row or line extending substantially longitudinally of the direction of movement of a first powered belt conveyor means to a second powered belt conveyor means so as to align said materials into a plurality of spaced rows or lines on said second belt conveyor means substantially transverse to the direction of movement of said second belt conveyor means, comprising

a. a first powered belt conveyor means,

b. push means for pushing materials transversely from said first conveyor means,

c. a receiving plate for receiving said materials pushed by said push means positioned opposite said first conveyor means and retractable substantially transversely from the direction of movement of said first conveyor means,

d. a baffle plate positioned immediately above said receiving plate spaced apart from the end of said receiving plate and opposite to said first conveyor means so as to permit said receiving plate to receive materials from said first conveyor means,

e. a second belt conveyor means movable substantially crosswise to and positioned beneath said first conveyor means and

f. spring-biased means to retract said receiving plate abruptly so as to cause said materials to contact said baffle plate and fall off of said receiving plate down onto said second conveyor means,

g. whereby said materials may be disposed on said second belt conveyor means in a plurality of spaced rows or lines.

3,877,564

INSTALLATION FOR CONVEYING PRINTED PRODUCTS ARRIVING IN AN OVERLAPPING FORMATION

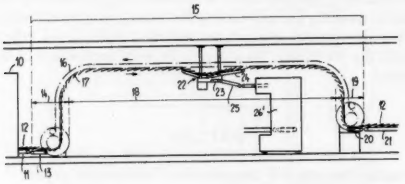
Walter Reist, Hinwil, Switzerland, assignor to Ferag AG, Hinwil, Switzerland

Filed Jan. 2, 1974, Ser. No. 429,518

Claims priority, application Switzerland, Jan. 12, 1973, 404/73

Int. Cl. B65g *37/00*

U.S. Cl. 198—103 7 Claims



1. An installation for conveying printed products arriving in an overlapping staggered formation, comprising an endless revolving driven transport mechanism, an infeed conveyor device and a withdrawal conveyor device, said transport mechanism being arranged between said infeed conveyor device and said withdrawal conveyor device, said transport mechanism being provided with controlled grippers serving to grasp the lateral edges of the products which are present in said overlapping staggered formation, transverse supports arranged in spaced relationship behind one another provided for said transport mechanism, said grippers being hingedly arranged in pairs opposite one another at said transverse supports, and wherein the infeed conveyor device and the withdrawal conveyor device are aligned at the underside with a respective section of the transport mechanism, said infeed conveyor device and said withdrawal conveyor device each possessing a respective revolving conveyor element having an active conveying run, said active conveying run together with the transverse supports which travel through the associated section of the transport mechanism forming a conveying channel.

3,877,565

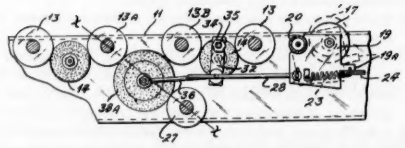
PRESSURE FREE ARTICLE CONVEYOR

Charles W. Werntz, Ferguson, Mo., assignor to Alvey Inc., St. Louis, Mo.

Continuation of Ser. No. 183,981, Sept. 27, 1971. This application Jan. 3, 1974, Ser. No. 430,259

Int. Cl. B65g *13/02*

U.S. Cl. 198—127 R 5 Claims



1. In an article conveyor having longitudinally spaced article carrying rollers, article sensing roller means normally projected above a predetermined group of said article carrying rollers to form the latter rollers into groups spaced along the conveyor, drive means operable along a fixed path spaced from said groups of article carrying rollers, a power take-off drive roller for each of said groups of article carrying rollers, each of said power take-off rollers being fixed in position so as to be constantly engaged with said drive means, a drive transfer wheel for each power take-off drive roller, link means connected to each of said drive transfer wheels and acting to hold said latter wheels in position to bear by gravity upon an adjacent power take-off drive roller, said drive transfer wheels being movable along the periphery of each power take-off drive roller into and out of frictional engagement with at least one of the rollers of a group of article carrying rollers adjacent said drive transfer wheel to rotate said one roller of the group, friciton wheels engaged between said article carrying rollers in each group to drive said rollers from said one roller of the group of article carrying rollers, and actuating means operably connected between a sensor roller and said link means to pull said drive transfer wheel in a direction along the periphery of the adjacent power take-off drive roller and into a position for driving a trailing upstream group of article carrying rollers, said actuating means and the connected link means being effective upon the depression of any one sensing roller by an article engaging the same to allow said associated drive transfer wheel to move in a direction disengaging said drive transfer wheel from driving the trailing group of article carrying rollers by moving said drive transfer wheel along the periphery of the engaged power take-off roller to a position out of fricitonal contact with the article carrying roller of said trailing group of article carrying rollers.

3,877,566

CHAIN CONVEYOR OF SWING-STIRRUP TYPE

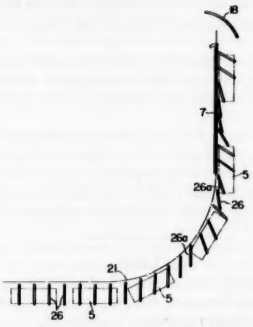
Motomu Harada, Tokyo, Japan, assignor to Nippon Suisan Kabushiki Kaisha, Tokyo-to, Japan

Filed Oct. 24, 1972, Ser. No. 300,255

Claims priority, application Japan, Oct. 26, 1971, 46-81931; Aug. 25, 1972, 47-84454; Aug. 25, 1972, 47-84455; Aug. 25, 1972, 47-99214[U]; Aug. 25, 1972, 47-99215[U]; Aug. 25, 1972, 47-99216[U]; Aug. 25, 1972, 47-99217[U]; Aug. 25, 1972, 47-99218[U]

Int. Cl. B65g *19/00*

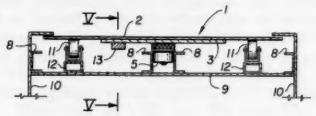
U.S. Cl. 198—160 20 Claims



1. In a chain-conveyor system adapted for use along an article conveying path having at least one portion which is other than straight and horizontal and including driving chain means and stirrup means pivotally supported by said chain means for transferring articles, the improvements comprising: said stirrup means being comprised of a plurality of swing stirrup means pivotally positioned in parallel relationship at spaced-apart locations, adjacent swing stirrup means cooperating to support an article being conveyed, each of said swing stirrup means having at least one horizontal pivotal shaft portion and a transverse load bearing portion always disposed below said horizontal pivotal shaft portion due to gravity, said horizontal pivotal shaft portion being positioned below and pivotally coupled to said chain means so as to be freely rotatable; and article guiding means for exerting at least one of horizontal force and a combination of horizontal and vertical force on said article comprised of guide members disposed at various locations along said conveyor path, at least one of said locations being the portion of said conveying path which is other than straight and horizontal, and shaped for guiding articles mounted on successively disposed swing stirrup means

during conveyance of said articles to secure article conveyance along various paths having any configuration.

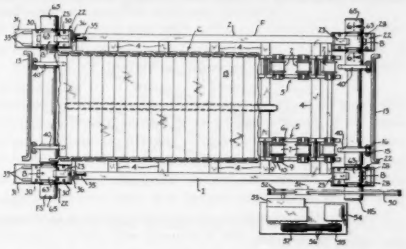
3,877,567
CONVEYOR DRIVE SYSTEM
Ronald Sommerfield, 7 Drillen Ct., Commack, N.Y. 11580
Filed Dec. 3, 1973, Ser. No. 420,792
Int. Cl. B65g *17/06*
U.S. Cl. 198—189 **7 Claims**



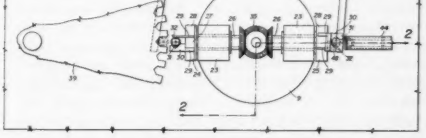
1. In a conveyor of the type including a multiplicity of plate-like conveyor surface members each having a longitudinal axis and means located at the longitudinal axis thereof pivotally connecting each of the plate-like members to the other in series, means for supporting the plate-like members for sliding motion along a given path, and guide means extending along the given path and operatively engaging the plate-like members for guiding them along the given path; a conveyor drive system comprising abutment means extending from each of the plate-like members at a location thereof laterally spaced from the respective longitudinal axis thereof, drive means located solely below said plate-like members comprising driven endless chain means having a run located below the level of said abutment means and extending along a predetermined length of the given path, and a plurality of engagement members carried by said endless chain means at spaced intervals along the length thereof, said engagement members being movable upwardly into a position on said run wherein they are, respectively, engageable with said abutment means for pushing the same the length of said run along the given path, said engagement members being movable downwardly below the respective abutment members at the end of said run, a guide means disposed along said run for maintaining said engagement members at a level at which they are engageable with said abutment means, said guide means comprising a substantially horizontal track underlying the path of travel of said engagement members along said run, and including roller means journalled on said engagement members and rollingly guided on said track along said path, said track having a cam section declining from the horizontal at the end of said run, said engagement members being guidable along said declining cam section out of engagement with said abutment means.

3,877,568
APRON CONVEYOR FOR QUARRY EQUIPMENT AND THE LIKE
Edward H. Breiling, West Allis, and Ronald B. Dediemar, Brown Deer, both of Wis., assignors to Barber-Greene Company, Aurora, Ill.
Filed Dec. 3, 1973, Ser. No. 421,406
Int. Cl. B65g *15/60*
U.S. Cl. 198—204 **8 Claims**

1. A heavy duty endless apron conveyor for quarry equipment and the like and comprising, a main frame, a shaft mounted on each of opposite ends of said main frame, an apron type endless conveyor trained around said shafts and having an upper flight; an anti-friction bearing assembly mounted on each end of each of said shafts, said bearing assemblies being self-contained, preassembled, pre-set and pre-lubricated, and comprising rollers, inner and outer double tapered races for said rollers, and means for sealing said bearings; and means for mounting each of said assemblies on said main frame and comprising a bearing mounting plate, a bearing adaptor mounted in said plate and having a generally semi-circular and upwardly facing opening which is inclined generally away from the center of said conveyor, said bearing assemblies mounted in said semi-circular openings for placement in and removable from said adaptors through said upwardly facing openings and without removal of said adaptors from said mounting plate.



3,877,569
APPARATUS TO TRANSFER AND INVERT A SYRINGE BARREL FROM ONE CONVEYOR TO ANOTHER CONVEYOR
Walter A. Shields, Jamaica, N.Y.
Filed Dec. 1, 1972, Ser. No. 311,334
Int. Cl. B65g *47/24*
U.S. Cl. 198—243 **10 Claims**

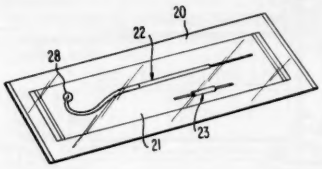


1. In apparatus to transfer and invert a syringe barrel from a first conveyor to a second conveyor spaced from the first conveyor, a turret oscillating between the conveyors, gripping members rotatably supported by the turret and arranged to removably hold a syringe barrel, means to oscillate said turret and transfer the gripping members from a syringe barrel receiving position to a syringe barrel discharge position, means to rotate the gripping members by the oscillation of the turret, means pivotally mounted and positioned relative to each conveyor, and means to oscillate the first of said pivotal means to transfer a syringe barrel from the first conveyor to a gripping member and to oscillate the second of said pivoted means to transfer a syringe barrel from a gripping member to the second conveyor.

3,877,570
STERILE COSMETIC SUTURE FOR ATTACHING HAIR PIECES TO SCALP AND METHOD OF PACKAGING AND UTILIZING
Robert J. Barry, 76 Cedargrove Rd., Little Falls, N.J. 07424
Filed July 25, 1973, Ser. No. 382,356
Int. Cl. A61l *17/02;* **A61b** *17/06*
U.S. Cl. 206—63.3 **2 Claims**

1. A cosmetic suture device comprising a suture assembly including a needle, a trailing length of human tissue compatible tubing secured to the needle and a weldable metal element extending through the tubing and being formable therewith into a closed loop after detachment of the needle from the assembly, a sterile enclosure for the suture assembly comprising a flexible transparent sterilizable sheath and being hermet-

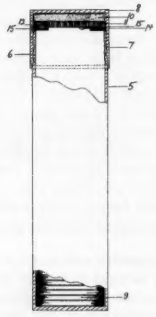
ically sealed, the suture assembly adapted to be sterilized with the sheath while inside of the sheath, and a cross bar subassembly consisting or a bushing and a metallic weldable element extending through the bushing and beyond the ends



thereof and contained in said sheath with the suture assembly and being sterilizable.

2. The structure of claim **1**, and an outer hermetically sealed envelope enclosing said device including the crossbar subassembly and being sterilizable with said device as a unit.

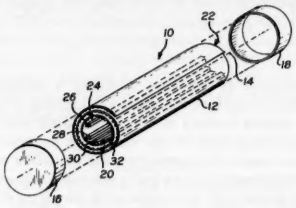
3,877,571
CONTAINERS FOR PROTECTING COPPER AND SILVER COINS AND THE LIKE FROM CORROSION
Allan Sanford, 5900 Arlington Ave., Salem, Mass. 10471
Filed May 30, 1973, Ser. No. 365,223
Int. Cl. A45c *11/28*
U.S. Cl. 206—83 **7 Claims**



1. A container for use in protecting at least one copper or silver coin and the like, said container comprising a coin-receiving portion and a cover closing said portion and secured thereto, an insert within the container, a seal releasably attached to said insert and operable to block said flow until a coin is to be placed in said container, and a body also within the container and including a volatile corrosion inhibiting agent thaqt is inert with respect to copper and silver, said insert between said body and the position to be occupied by a coin and operable to permit the flow of gas as the agent decomposes to said position and to prevent a coin in said position blocking said flow.

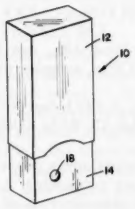
3,877,572
CONVERTIBLE STORAGE CONTAINER/PICTURE FRAME ASSEMBLY
Samuel Wiener, Jr., 2 River Ln., Westport, Conn. 06880
Filed Oct. 31, 1973, Ser. No. 411,472
Int. Cl. B44d *3/00*
U.S. Cl. 206—223 **10 Claims**

1. A convertible storage container for a plurality of cooperable picture framing elements adapted to be converted into a picture frame having a backing board in cooperation with said framing elements stored therein comprising an outer backing board member peripherally surrounding said framing elements in a storage position for forming an enclosed storage container therefor, said outer member having a longitudinal axis in said storage position about which said outer backing board member peripherally surrounds said framing elements stored therein, said outer member being open at opposite ends thereof along said longitudinal axis in said storage position thereof for removably receiving said framing elements therethrough; first and second capping members removably mountable at said opposite ends of said outer member in said storage position thereof for completely enclosing said framing elements within the interior of said peripherally surrounding outer member in said mounted position thereof to form said enclosed storage container; said framing elements comprising a plurality of slotted joinable framing members removable



from said storage enclosure interior and adapted to form a complete peripheral frame when removed and joined together for display of a picture mountable in said slotted framing members in a picture framing position of said elements, said outer backing board member being convertible to a substantially planar configuration with said capping members removed, said outer backing board member being mountable in said removable joined slotted framing members in said substantially planar configuration thereof in said picture framing position, said outer member enhancing the rigidity of said joined framing members while providing backing for a picture mountable in said slotted joined framing members in said planar configuration thereof, while providing a protective storage enclosure for said framing elements in said peripherally surrounding configuration thereof.

3,877,573
COMPARTMENTALIZED TROCHE DELIVERING CIGARETTE CONTAINER
Morton W. Scott, San Rafael, and Larry Beck, Greenbrae, both of Calif., assignors to Ican Laboratories, Inc., San Rafael, Calif.
Filed Jan. 17, 1974, Ser. No. 434,317
Int. Cl. B65d *5/85*
U.S. Cl. 206—236 **7 Claims**



1. Apparatus for carrying both a number of cigarettes and a plurality of troches for discouraging smoking, said apparatus comprising:

a vertically elongate box open at the top;

means for dividing the interior of said box into first and second parallel vertical chambers, said first chamber adapted to contain a plurality of troches and including

aperture means for dispensing said troches, said second chamber communicating with the open top of the box and adapted to contain a number of cigarettes adapted to be dispensed through said open top; and

means for covering at least the open top of the box and the aperture means in the first chamber, said cover means being at least partially removable and adapted to expose the aperture means prior to the open top of the box upon said removal to provide the user with access to the troches prior to access to the cigarettes.

3,877,574

HIGH SPEED TURBINES

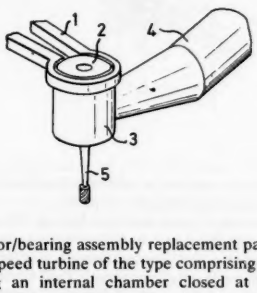
Herbert Percy Killick, London, England, assignor to Dental Manufacturing Engineering Limited, London, England

Filed Mar. 12, 1973, Ser. No. 340,472

Claims priority, application United Kingdom, Apr. 4, 1972, 15531/72

Int. Cl. A61c *1/10, 1/14*

U.S. Cl. 206—368 **2 Claims**



1. A rotor/bearing assembly replacement pack for a miniature high speed turbine of the type comprising a turbine housing having an internal chamber closed at one end by a threaded housing cap and a rotor/bearing assembly operatively mounted in said chamber; said pack comprising a container threaded at one end in correspondence with said threaded housing cap, a plunger slidably mounted in the opposite end of said container, a container cap closing said one end of said container, and a replacement rotor/bearing assembly mounted in said housing in correct orientation to be expelled from said container into operative position in a turbine housing chamber by depression of said plunger when said container cap is removed and said container is threaded onto the turbine housing in place of its housing cap.

3,877,575

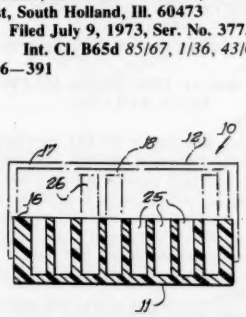
FILM TRAY HOLDER

Victor J. Cracco, and Ruth A. Cracco, both of 15449 Woodlawn East, South Holland, Ill. 60473

Filed July 9, 1973, Ser. No. 377,808

Int. Cl. B65d *85/67, 1/36, 43/08*

U.S. Cl. 206—391 **2 Claims**



1. A film tray holder for providing an orderly manner for storing and transporting a multiplicity of individual film containers, the holder comprising, in combination:

a solid rectangularly elongated box shaped base member consisting of a flat horizontal bottom surface, a flat horizontal top surface spaced vertically from said bottom surface, opposed parallel front and back wall surfaces, and opposed parallel side wall surfaces;

said front, back and side wall surfaces of said base member being spaced apart a dimension greater than the sum of a plurality of individual film containers to be stored therein;

a plurality of identically shaped and configured vertically extending slots disposed in said base member in the form of rows extending parallel to said front and back walls and columns extending parallel to said side walls, each of said slots being dimensioned to have a length and width slightly greater than the length and width of the film container to be inserted therein so as to readily accept the insertion of the film container into the slot, the depth of each slot in the base member being less than the height of the film container to be inserted therein such that the film container projects vertically outwardly of the slot above said base member horizontal top surface when the container is inserted into the slot, each of said slots being, in cross-section, rectangular having square corners to receive a square cornered film containter therein;

a web portion formed between each of the adjacentmost slots extending parallel to said base member front and back walls and within the opposite ends of the slots, said web portion fashioned to receive indicia bearing information thereon to identify the contents of the film container inserted into the adjacentmost slot;

the width of each slot together with the web portion associated therebetween, in addition to the peripheral marginal portion of said base top surface extending along said front and back walls thereof defining the overall maximum width dimension of said base member;

a rectangularly shaped box-like cover member having a flat horizontal top surface, vertically depending opposed front and back wall surfaces extending downwardly from front and back peripheral edges respectively of said top surface, and vertically depending downwarldy opposed parallel side walls extending downwardly from associated side edges of said top surface, said cover side walls and said cover front and back walls each extending an equal vertical distance and terminating in a bottom edge with the bottom edges thereof defining a horizontal plane parallel to said cover top surface and spaced vertically therebeneath;

a compartment defined interiorly of said cover opening out of said bottom end thereof between said bottom edges, the compartment being of a width and length slightly greater than the width and length of said base member to receive said base member telescopically therein;

a horizontally extending ridge formed integrally with the interior surfaces of said cover side walls, front wall and back wall and extending completely therearound to define an annular shoulder spaced inwardly of said cover bottom edges and extending horizontally thereabout parallel to said cover top surface, the spacing between said annular shoulder and the interior of said cover top surface being greater than the projection of said film containers above said base member horizontal top surface;

said cover when telescopically placed on said base member engaging the peripheral edges of said base member top surface on said annular shoulder to support said cover thereon with an air gap existing between the top of the film containers and the interior surface of the cover top surface to prevent any squashing or pressure of the film containers by the cover;

said annular shoulder forming with said cover side wall, back wall and front wall a dust tight seal extending continuously completely about the top surface of the base member to protect the film containers positioned therein to prevent dust, contaminants and other foreign matter

from deteriorating the film stored in the film containers positioned in said base member; and

a pair of rectangularly shaped recesses formed integrally in said cover front wall and said cover back wall and disposed in diametric alignment with each other centrally of said wall surfaces and formed contiguous with said bottom edge thereof, said recesses defining hand engaging recesses to facilitate ease of removal of said cover from said base member to gain access to the film containers stored therein.

3,877,576

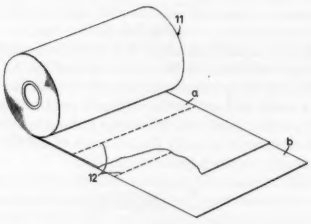
TOILET PAPER ROLL

Emitsu Kishi; Osamu Shinohara, and Haruhisa Ishikawa, all of Kawanoe, Japan, assignors to Shinhama Pump Mfg. Co., Ltd., Kawanoe-shi, Ehime-ken, Japan

Filed July 31, 1973, Ser. No. 384,190

Int. Cl. B65d *85/67*

U.S. Cl. 206—412 **2 Claims**



1. A paper roll comprising two overlapping webs of paper with transverse perforation lines at predetermined intervals, said perforation lines on one web adapted to be located halfway between adjacent perforation lines on the other web so that the perforation lines on the inner web are provided at fixed intervals while the perforation lines on the outer web are provided at variable intervals longer than the fixed intervals on the inner web by a value which is proportional to the product of the fixed interval and thickness of the web and inversely proportional to a radius of the paper roll.

3,877,577

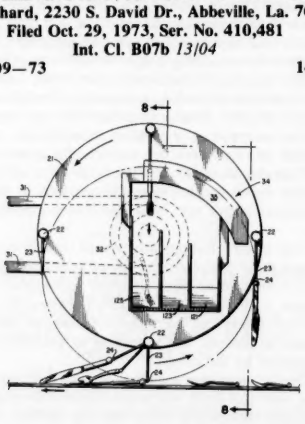
CULINARY ARTICLES AND APPARATUS FOR RETRIEVING AND/OR SORTING THE SAME

Wilton Richard, 2230 S. David Dr., Abbeville, La. 70510

Filed Oct. 29, 1973, Ser. No. 410,481

Int. Cl. B07b *13/04*

U.S. Cl. 209—73 **14 Claims**



1. In combination (a) culinary items having magnetically responsive end portions differing in cross-sectional sizes according to the article, like articles having end portions of like cross-sectional size, the balance of the articles being essentially non-magnetically responsive, (b) means for magnetically carrying said items by means of said end portions, and (c) means for classifying said items according to said sizes and isolating the classified articles each from the other.

3,877,578

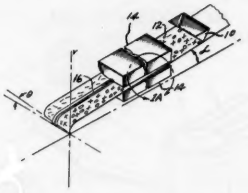
SEPARATION PROCESS FOR FLINT, AMBER, AND GREEN GLASS PARTICLES FROM A MIXTURE OF THE THREE COLORS

Booker W. Morey, Pasadena, Calif., assignor to Occidental Petroleum Corporation, Los Angeles, Calif.

Filed Sept. 18, 1972, Ser. No. 290,064

Int. Cl. B03c *1/00*

U.S. Cl. 209—215 **11 Claims**



1. A process for separating a mixture of particulate glasses of different colors comprising the steps of:

passing a mixture of glass particles having different magnetic susceptibilities and including paramagnetic green and diamagnetic flint glasses through a magnetic field having a relatively greater magnetic field strength nearer one side edge of the path of the glass particles and a relatively lower magnetic field strength nearer the other side edge of the path of the glass particles;

superimposing an acceleration force on the magnetic field, the acceleration force having a component transverse to the path of the glass particles from one side edge towards the other; and

collecting a first fraction of glass particles having particles of glass including paramagnetic green glass from the side edge of the path subject to the greater magnetic field strength and a second fraction of glass particles including diamagnetic flint glass from the other side edge of the path which is subject to the lower magnetic field strength.

3,877,579

ADJUSTABLE CONNECTOR FOR STRUCTURAL MEMBERS

John J. Weider, Arlington Heights, Ill., assignor to Speedrack Inc., Skokie, Ill.

Filed Mar. 21, 1974, Ser. No. 453,198

Int. Cl. A47f *5/10*

U.S. Cl. 211—176 **10 Claims**

1. A storage rack structure or the like including a column to which a structural member is attached, said column having first and second generally parallel surfaces which surfaces have aligned holes located at spaced vertical intervals,

said structural member including first and second walls disposed generally at right angles to each other and having elongated slot means in said first wall,

bolt means extending through aligned holes and through said slot means,

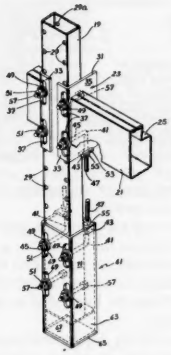
locking nut means mated with said bolt means and holding said first wall in tight contact with said first surface,

generally L-shaped connecting means including first and second legs having threaded ends, said first leg extending through aligned holes with its free end protruding through

said slot means and said second leg extending past a generally horizontal edge of said second wall,

an apertured clip carried by said second leg and engaging said horizontal edge of said second wall, and

nut means in threaded connection with each said threaded end,



whereby adjustment of said nut means on said second leg moves said clip and effects precise changes in the relative vertical alignment of said column and said structural member and whereby thereafter tightening of said nut means on said first leg clamps said column between said clip and said slotted first wall.

3,877,580

ADJUSTABLE ARTICLE RETAINING DEVICE FOR SHELVES

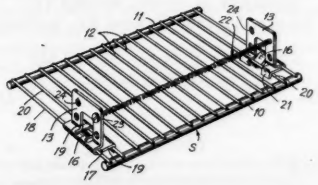
John Rune Hammar, Spanga, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed Nov. 1, 1973, Ser. No. 411,720

Claims priority, application Sweden, Nov. 8, 1972, 14471/72

Int. Cl. A47f *5/00*

U.S. Cl. 211—184 **9 Claims**



1. An adjustable article retaining device in combination with a shelf, said shelf comprising a pair of spaced support rails and a plurality of spaced connecting wires extending perpendicular to said support rails said adjustable retaining device comprising, a pair of clips, each of said clips being mounted on the end connecting wire on opposite sides of said shelf, each of said clips having an upstanding portion and being provided with a depending tab that lies under the adjacent connecting wire, and a support member for said articles having opposite ends romovably attached to the upstanding portions of respective clips, said support member being resilient in a direction along its longitudinal axis to thus exert pressure on the clips to frictionally engage the respective end connecting wire to thereby prevent displacement thereof.

3,877,581

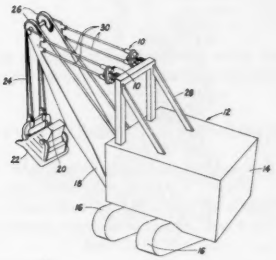
TENSION EQUALIZER

Marvin L. Auxer, Tulsa, Okla., assignor to Unit Rig & Equipment Co., Tulsa, Okla.

Filed Feb. 20, 1973, Ser. No. 334,158

Int. Cl. B66c *23/88*

U.S. Cl. 212—65 **6 Claims**



2. In a large excavating machine of the type having a boom member, a gantry means, at least one pair of jib lines connected from one side of said gantry means to one side of said boom member and at least one pair of jib lines connected from an opposite side of said gantry means to an opposite side of said boom member in spaced relation to the first-mentioned pair of jib lines; a tension equalizer device for each pair of jib lines, each tension equalizer device comprising an elongated connector arm having one end thereof pivotally connected to the gantry means, a yoke member, pivotal yoke attachment means for universally and pivotally connecting the yoke member to the opposite end of the connector arm, a spaced pair of yieldable connector means disposed on opposite sides of the yoke attachment means, means for pivotally attaching the yieldable connector means to the yoke member, said pair of yieldable connector means being connected respectively to the ends of a pair of jib lines for maintaining substantially equal tension between the said jib lines.

3,877,582

PANEL POSITIONING APPARATUS

Charley H. Moore, 245 Merced St., Salinas, Calif. 93901

Division of Ser. No. 169,772, Aug. 6, 1971, Pat. No. 3,782,771. This application June 13, 1973, Ser. No. 369,425

Int. Cl. B60p *1/14*

U.S. Cl. 214—1 SW **7 Claims**

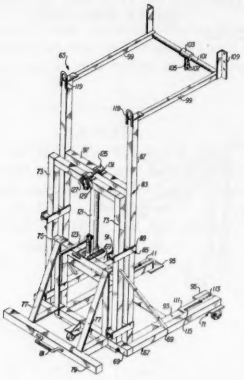
1. A dolly for guiding prefabricated building panels into position comprising:

frame means for stabilizing and positioning a panel resting vertically therein, said frame means including a generally U-shaped lower portion having two side members which carry wheel means at the open end thereof for laterally moving said frame means along a level surface;

support means slidable vertically on and cooperably associated with said frame means for supporting panel, said support means being operable to lower a panel onto the level surface;

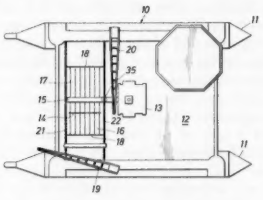
said support means including horizontally extending arm means being laterally spaced inwardly from said side members for supporting a panel beyond said U-shaped lower portion and guide means vertically spaced from said arm means for keeping a panel in a generally vertical position, and

jacking means acting between said frame means and said support means for selectively vertically positioning said



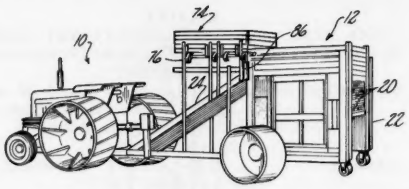
support means and panel associated therewith with respect to said frame means.

3,877,583
PIPE RACKING SYSTEM
Donald G. Bokenkamp, Houston, Tex., assignor to Dolphin International, Inc., Houston, Tex.
Filed Jan. 18, 1974, Ser. No. 434,665
Int. Cl. E21b *19/14*
U.S. Cl. 214—2.5 **10 Claims**



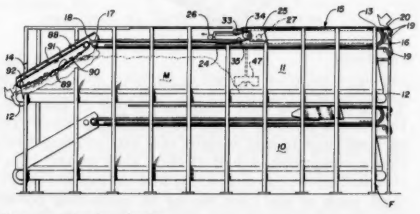
1. An offshore drilling system including
platform means adapted to be located above the water surface,
drilling means located on said platform means for carrying on drilling operations,
skidway means on said platform extending in one direction from said drilling means for accomodating the longitudinal length of a drill pipe section so that a pipe section can be disposed longitudinally in said skidway means and can be moved lengthwise to and from said drilling means,
pipe rack means for stacking and retaining pipe sections for use in the drilling operations, said pipe rack means being disposed transversely to said skidway means,
guide rail means straddling said pipe rack means from said skidway means across the length of said pipe rack means, means for manipulating pipe sections horizontally and vertically along the length of said pipe rack means including U-shaped frame means disposed across the width of said pipe rack means, wheels for supporting said frame means relative to said guide rail means and for permitting said frame means to traverse said pipe rack means, and
independent means on said frame means for coupling to opposite ends of a pipe section for manipulating said pipe section vertically with respect to said pipe rack means.

3,877,584
APPARATUS FOR LOADING SOD ON PALLETS
James E. Holcombe, 2331 E. Long Lake Rd., Troy, Mich.
Filed Oct. 9, 1973, Ser. No. 404,227
Int. Cl. B65g *57/32*
U.S. Cl. 214—6 B **7 Claims**



1. Apparatus for loading on pallets sod being harvested from the ground, comprising:
a wheeled frame and means connected thereto for advancing the frame across the ground;
conveyor means having an upper end and a lower end carried by the frame for raising a slab of sod of a predetermined length from the lower end to the upper end of the conveyor means;
a pair of plates slidably supported on said frame in a substantially horizontal, co-planar relationship adjacent the upper end of the conveyor means so as to be movable between a closed position, substantially in abutment one with the other, for receiving the slab of sod in a first position;
rake means mounted above the plates for engaging the slab of sod being discharged from the upper end of the conveyor means and slidably moving the slab on the plates toward said first position;
a pallet disposed on said frame beneath the closed position of the plates for receiving the slab of sod in a stacked position on the pallet, and;
means connected to the plates for moving them toward an open position in which one plates is so spaced with respect to the other as to permit the slab of sod mounted thereon in said first position to drop down between the plates onto said pallet as the plates are being moved toward said open position.

3,877,585
MATERIAL DISTRIBUTING SYSTEM FOR NONFREE-FLOWING PRODUCTS
Ralph D. Burgess, Jr., 2800 Pheasant Rd., Excelsior, Minn. 55331
Filed Feb. 4, 1974, Ser. No. 439,342
Int. Cl. B65g *65/30*
U.S. Cl. 214—17 CA **23 Claims**



16. In a positioning device,
a. a movable platform,
b. means for urging said platform in a predetermined direction,
c. a source of rotary power,
d. a differential mechanism having a power input and a pair of power outputs,

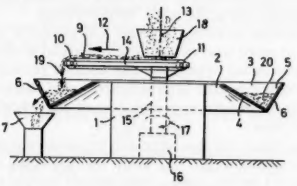
e. said differential mechanism being connected to said platform and having its power input connected to said source of rotary power in driven relation,
f. a rotary sensor connected in driven relation to one of the power outputs of said differential mechanism and,
g. platform moving mechanism connected to said platform and connected in driven relation to the other power output of said differential mechanism for driving said platform in the opposite direction when said rotary sensor is prevented from rotating.

3,877,586

DEVICE FOR FEEDING A PLURALITY OF CIGARETTE MACHINES WITH CUT TOBACCO

Karl Wilhelm Quester, Cologne-Lindenthal, Germany, assignor to Wilh. Quester, Cologne, Germany

Filed Jan. 2, 1973, Ser. No. 320,277
Claims priority, application Germany, Jan. 25, 1972, 2203385
Int. Cl. B65g *65/42*
U.S. Cl. 214—17 CA **5 Claims**



1. A mechanism for feeding a mass of material to a plurality of consumption areas comprising a conveyor belt means for feeding material upon an upper run of said conveyor belt, said conveyor belt upper run being adapted for delivering the material deposited thereupon toward a discharge end, means mounting said conveyor belt for rotational movement about a generally vertical axis such that material being delivered therefrom moves in a generally circular path, means into which the material is delivered from the upper run of said belt, means for detecting the level of deposited material during the rotational movement of said conveyor belt along said circular path, and means responsive to the detection means for generally simultaneously stopping rotation of said conveyor belt about said vertical axis, imparting motion to the upper run thereof, and instituting the operation of said feeding means.

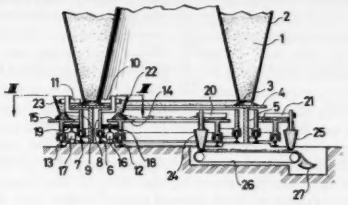
3,877,587

DISCHARGING MEANS FOR VESSELS FOR STORING POWDER, GRAIN AND THE LIKE

Takuji Ishizaki, Tokyo, Japan, assignor to Mitsui Shipbuilding and Engineering Co. Ltd., Chuoku, Tokyo, Japan

Filed Mar. 18, 1974, Ser. No. 452,001
Claims priority, application Japan, Mar. 19, 1973, 48-33501
Int. Cl. B65g *65/48*
U.S. Cl. 214—17 D **1 Claim**

1. A discharging means for material containing vessels having an inverted conical structure and having an annular outlet opening at the bottom thereof, comprising a stationary annular table provided below and in the vicinity of the annular outlet opening to receive material therefrom, scrapers disposed on each side of said annular table and in close proximity to the surface thereof, rotatable annular inner and outer tables provided below and in the vicinity of said stationary annular table and adapted to receive material scraped from said stationary table, and stationary scrapers extending in close proximity to the surfaces of said inner and outer tables, whereby the discharged material can be successively scraped off.

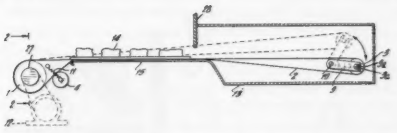


3,877,588

APPARATUS FOR LOADING AND UNLOADING A HOT OVEN

Nicolas M. Meisel, Epone, France, assignor to DCA Food Industries Inc., New York, N.Y.

Filed Nov. 26, 1973, Ser. No. 418,972
Claims priority, application France, Dec. 4, 1972, 72.43117
Int. Cl. F27b *9/38*
U.S. Cl. 214—21 **6 Claims**



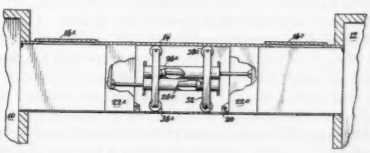
1. A belt conveyor system for loading and unloading an oven comprising
closing means for said oven;
an endless belt having one section located partly within the oven and another section located outside of the oven and extending away from said closing means;
support means located outside of and adjacent the oven and extending away from said closing means; and
said other section of said belt comprising upper and lower parts in contact with each other and said support means and travelling in opposite directions when said belt moves.

3,877,589

INCINERATOR LOADER

Richard F. Stockman, Friendship, N.Y., assignor to The Air Preheater Company, Inc., Wellsville, N.Y.

Filed Oct. 11, 1973, Ser. No. 405,386
Int. Cl. B65g *25/08*
U.S. Cl. 214—23 **5 Claims**



1. Apparatus for selectively moving a quantity of refuse into either of a pair of spaced chambers comprising an elongate feed cylinder between chambers, loading openings located at opposite ends of said feed cylinder adjacent each of the spaced chambers for loading refuse therein, a pair of axially movable compaction members in said elongate cylinder intermediate the loading openings, means for moving the compaction members axially in said cylinder to push waste material

from said loading openings into the spaced chambers including a single pair of oppositely disposed drive cylinders intermediate the compaction members, axially movable drive means in said drive cylinders connected at their outboard ends to the compaction members for moving compaction members axially in said feed cylinder, means supporting said drive cylinders for movement freely along the longitudinal axis of the feed cylinder, a source of driving fluid, means supplying the driving fluid to each of said cylinders, and means for locking one of the compaction members relative to said feed cylinder whereby the drive means will move the unlocked compaction member along the longitudinal axis of the feed cylinder substantially equal to the sum of the longitudinal distance traveled by both driving means within their respective cylinders.

3,877,590

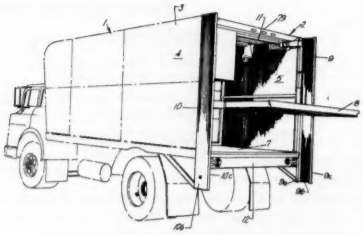
LIFT GATE ASSEMBLY

Donald C. Brown, Box 194, Botkins, Ohio 45306

Continuation of Ser. No. 355,031, April 27, 1973, abandoned, which is a division of Ser. No. 167,976, Aug. 2, 1971, Pat. No. 3,747,782. This application Feb. 11, 1974, Ser. No. 441,455

Int. Cl. B60p *1/44*

U.S. Cl. 214—75 T **8 Claims**



1. A lift gate assembly comprising a frame, said frame comprising a pair of vertical frame members in parallel spaced relationship, an upper crosstie and a lower crosstie joining said vertical frame members, each of said vertical frame members having a stationary vertically oriented channel member affixed thereto, said channel members being of C-Shaped cross-section, the longitudinal openings of which face in the same direction and away from said vertical frame members, roller-carrying units, each of said roller-carrying units comprising a vertically oriented, elongated, plate-like structure having longitudinal sides and forward and rearward edges, each of said units having a plurality of vertically aligned pairs of rollers adjacent said rearward edge thereof, the rollers of each pair being located on opposite sides of said unit, said rearward edges of each of said units extending within said longitudinal opening of one of said channel members, said roller pairs along said rearward edge of said unit being located in and rotatable in said channel member, each of said units being movable vertically with respect to its respective channel member between an upper position wherein a portion of said unit extends above said channel member and a lower position wherein a portion of said unit extends below said channel member, stop means operatively connected to said units and said channel members to cause each of said units to be captively held in and at all times having at least two roller pairs in its respective channel, a lift gate, said lift gate being affixed to the lower ends of said plate-like structures, means for vertically moving said units and lift gate between said upper and lower positions and means to control said moving means.

3,877,591

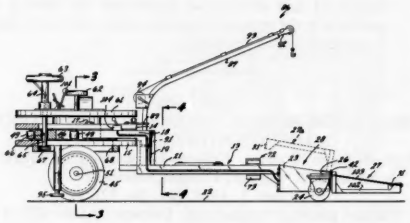
APPARATUS FOR MOVING VEHICLES

John J. Howard, 5925 Cecilia St., Bell Gardens, Calif. 90201

Filed June 10, 1974, Ser. No. 477,800

Int. Cl. B60p *3/06*

U.S. Cl. 214—86 A **14 Claims**



1. An apparatus for towing a wheeled vehicle, having a plurality of wheels comprising:

a frame;

a pair of arms mounted to said frame to extend horizontally and forming an acute angle therebetween;

a wheel means including a wheel and mounted under said frame to pivot with respect thereto about a vertical axis;

a caster capable of pivoting also about a vertical axis and disposed under each arm to support said respective arm;

a cradle means for engaging one of the wheels on said vehicle; and

mounting means for mounting said cradle means on the end of each of said respective arms, and including means for lifting said cradle means with respect to said respective arm to lift the respective wheel on said vehicle.

3,877,592

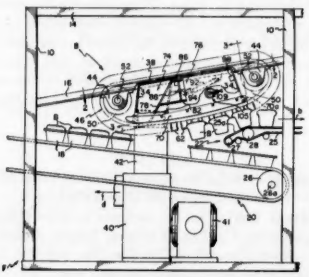
BAKERY PRODUCT DEPANNING APPARATUS

Norman O. Krenke; John R. Baker, both of Saginaw; DeWitt Sims, Burt, all of Mich., and Carl R. Skarin, Southern Pines, N.C., assignors to Baker Perkins Inc., Saginaw, Mich.

Filed Aug. 30, 1973, Ser. No. 392,939

Int. Cl. A21b *3/18*

U.S. Cl. 214—309 **4 Claims**



1. Transfer apparatus for lifting bakery product, such as bread loaves, from product supply conveying means and transferring them to a remote location comprising:

elongate, vacuum box means, adapted to at least partially overlie said product supply conveying means, including upstream and downstream vacuum chambers of predetermined volume separated by vacuum segregating means, each of said vacuum chambers including opening providing means along one side thereof;

vacuum source means communicating with said upstream chamber for evacuating air from said upstream chamber to create a vacuum therein;

said vacuum segregating means including opening means communicating with said chambers and being of such minimum size as to permit at least sufficient air to be evacuated from said downstream chamber to said upstream chamber to maintain at least a minimum vacuum level in said downstream chamber;

suction transfer means traveling forwardly along said one side of said chambers in communication with the chambers through said opening providing means to exert suction on said forwardly moving products to hold said products and transfer said products from said conveying means; and

means for selectively increasing the size of said opening means to increase the flow of air being evacuated from said downstream chamber to said upstream chamber to increase the vacuum level in said downstream chamber above said minimum level;

said opening means comprising a first fixed opening of such size as to permit sufficient air to be evacuated from said second chamber to at least maintain said minimum vacuum level in said downstream chamber, and a second opening; said means for increasing the size of said opening means in said segregating means comprising actuable means movable between a position covering the second opening and a removed position.

3,877,593

DUMPING DEVICES FOR USE WITH FORK LIFT TRUCKS

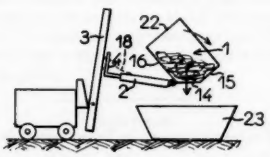
Ladislas Sleziak, 34 Rue de l'Echelle, Bogny sur Meuse, France

Filed July 17, 1972, Ser. No. 272,324

Claims priority, application France, Oct. 29, 1971, 71.39451

Int. Cl. B66f *9/12*

U.S. Cl. 214—315 **5 Claims**



1. In combination: a fork lift truck having a tiltable lift assembly including projecting lift members disposed for forward and backward and for upward and downward movements and for tilting movements in vertical planes; a dumping device comprising a container receptive of material for discharge therefrom and having a planar base, an opening opposite said base and a wall between said base and said opening said base having an edge portion; linkage means which comprise supporting means having a first end receptive of the projecting members of the fork lift assembly on insertion of said members at said first end of said supporting means, said supporting means having another end, and means disposed along said edge of said base portion remote from said first end of the supporting means for pivotally connecting the other end of said supporting means to a portion of said base and for thereby defining a first pivot axis about which said container can pivot approximately 180° when said container is at a given height from a rest position wherein said base portion is disposed below said opening, to a discharging position wherein said base portion is disposed above said opening, solely in response to tilting of said lift assembly, to thereby discharge any material in the container; said container having means defining corner portions of said wall to define at least two additional pivot axes parallel to said first pivot axis enabling said linkage means to substantially restore said container to said rest position, solely in response to simultaneous backward and downward movement of said projecting lift members.

3,877,594

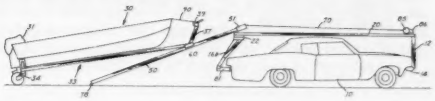
CAR TOP BOAT CARRIER WITH LOADER AND UNLOADER

Donald L. Coakley, 101 Washington, Golden, Colo. 80401

Filed Nov. 21, 1973, Ser. No. 417,974

Int. Cl. B60p *3/10*

U.S. Cl. 214—450 **6 Claims**



1. A vehicle-top boat carrier with loader-unloader comprising

a. frame means including an upstanding front bumper mounted support and a pair of spaced apart rear bumper mounted supports secured to the vehicle and providing a central, generally horizontal elongated member extending generally longitudinally and above the vehicle.

b. an elongated walking beam having ground contacting wheels; said beam being reciprocably mounted on said elongated member, and stop means on both ends of said beam,

c. means including a pivotal fixture attached to the elongated member securing said walking beam to said elongated member and permitting reciprocable movement of said walking beam rearwardly of said elongated member and permitting tilting and ground movement of said walking beam at the rear of said elongated member,

d. boat holding means including spaced apart ground contacting wheels providing a low profile unit, including spaced apart boat stabilizing rails extending longitudinally and means for supporting a boat, said boat holding means capable of receiving and carrying a boat during loading and transportation of the boat

e. reciprocable means mounted on and arranged for reciprocal movement along said walking beam between said stop means and including boat holding attachment means for securing said boat holding means thereto, and

f. haul rope means secured to said reciprocable means and to a forward portion of said frame means, whereby movement of the rope first causes movement of the reciprocable means along said walking beam until it engages the forwardmost of the stop means, continued movement of the rope causes said reciprocable means along with said walking beam to move forwardly, pivot about said pivotal fixture, and then reciprocate along said frame means.

3,877,595

BALE LIFTER AND CARRIER

Andrew J. Edelman, Sabetha, Kans., assignor to Donald L. Johnson, Topeka, Kans.

Filed Dec. 10, 1973, Ser. No. 423,318

Int. Cl. B60p *1/04*

U.S. Cl. 214—506 **4 Claims**

1. A lifter and carrier for a cylindrical bale of hay or the like comprising:

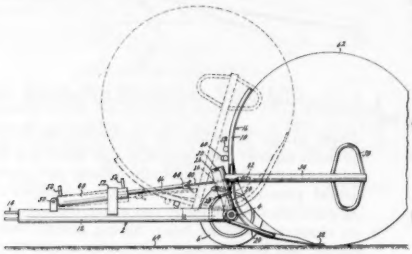
a. a carriage adapted to be moved over the ground,

b. a cradle of generally arcuate curvature in cross-sectional contour about a horizontal axis, mounted pivotally on said carriage for movement about a horizontal axis disposed externally of its curvature and parallel to the general axis of curvature thereof, being movable between a lowered position in which it opens horizontally rearwardly with respect to the normal direction of travel of said carriage, with its lower extremity substantially at

ground level, its lower edge, when in said lowered positions, being insertable by movement of said carriage between the ground and a cylindrical bale resting on its cylindrical surface, to engage said cradle with said cylindrical surface, and a raised position in which it is disposed entirely above ground level and opens upwardly,

c. a pair of clamp arm supports mounted in said carriage and movable with said cradle,

d. a pair of clamp arms pivoted respectively on said supports and extending generally rearwardly from their pivots when said cradle is lowered, whereby to be disposed respectively at opposite ends of a bale engaged in said cradle, and pivoted on axes generally normal to said cradle pivotal axis,



e. clamp jaws carried at the free ends of said clamp arms,

f. resilient means biasing said clamp arms pivotally apart whereby said jaws do not engage said bale,

g. a single operating member carried by said carriage for movement in a generally straight line,

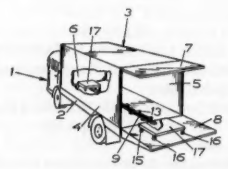
h. connecting means joining said operating member to said cradle and jaws and operable, during movement of said operating member in one direction first to actuate said clamp arms to grip said bale between said jaws with an endwise pressure, and then to elevate said cradle from its lowered position to its raised position,
and

i. power means operable to move said operating member.

3,877,596
GOODS VEHICLE HAVING AT ITS REAR A VERTICALLY MOVABLE-DECK

Gote Hubert Bohman, Hudiksvall, Sweden, assignor to B.V. Foco Nederland, Bedum, Netherlands

Filed Aug. 14, 1973, Ser. No. 388,258
Claims priority, application Sweden, Aug. 18, 1972, 10758/72
Int. Cl. B60p *1/44*
U.S. Cl. 214—518 **5 Claims**

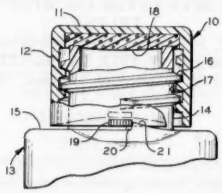


1. An improvement in goods vehicles comprising a loading platform, a continuous conveyor means on said platform, a support beam extending in the longitudinal direction of said loading platform and arranged for longitudinal movement relative thereto, a pulley arranged at each end of said beam, said conveyor means travelling over said pulleys, equidistantly spaced driving carriages on said conveyor means, load-carriers, generally in the form of goods transport containers, driven by said driving carriages when engaged thereby, a first pair of runner wheels on each one of said load-carriers, the support shaft of said first pair of runner wheels being fixed, a second pair of runner wheels on each one of said load-carriers, the support shaft of said second pair of wheels being pivotally mounted, a movable deck provided at the rear of said goods vehicle, said deck arranged to be raised and lowered into a level essentially flush with the loading platform level, the improvement comprising said deck incorporating an oblique surface inclining upwardly and forwardly towards a plateau, said plateau delimiting an area positioned at a lower level, said first runner wheels of the load-carrier having the fixed support being arranged to move within said area without coming into contact therewith when said load carrier is in an engaged relation with one of said driving carriages.

3,877,597
CHILD-RESISTANT CLOSURE FOR LIQUID CONTAINERS

Gary V. Montgomery, Evansville, and Randall K. Julian, Elberfeld, both of Ind., assignors to Sunbeam Plastics Corporation, Evansville, Ind.

Filed Mar. 6, 1974, Ser. No. 448,449
Int. Cl. B65d *55/02, 85/56;* **A61j** *1/00*
U.S. Cl. 215—221 **10 Claims**



1. A child resistant closure for liquid materials, said closure consisting of

a. a container having a body, a threaded neck and a generally outwardly extending annular shoulder at the base of said neck and connecting said neck to said body,

b. a cup-shaped cap having a tubular skirt that has internal threads mating with the threads on said neck and a generally flat top,

c. cooperating disengageable lug means at the bottom of said skirt and on said shoulder for preventing removal of said cap by retrograde rotation thereof unless said lug means are disengaged, said lug means automatically engaging when said cap is turned onto said neck to at least an engagement position,

d. a resilient liner underlying the top of said cap and adapted to be compressed against the end of said neck when said cap is turned onto said neck at least to such engagement position,

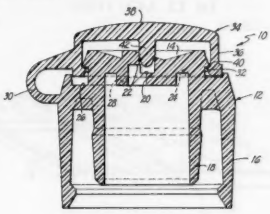
e. said skirt and said neck being of such axial lengths that the lower end of said skirt engages said shoulder when said cap is turned onto said neck at least to such engagement position,

f. and said liner being of such normal thickness and resiliency that said liner is compressed against said neck when said cap reaches engagement position and is not set beyond resilient restoration when said cap skirt engages said shoulder.

3,877,598
CLOSURE STRUCTURES HAVING CHILD-SAFETY FEATURE

Robert E. Hazard, North Kingston, R.I., assignor to Polytop Corporation, Slatersville, R.I.

Filed Feb. 25, 1974, Ser. No. 445,531
Int. Cl. B65d *55/02, 55/56;* **A61j** *1/00*
U.S. Cl. 215—224 **10 Claims**



1. In a closure structure having a base with an opening leading therethrough and a cap having a top, said cap being intended to be positioned on said base so that said top covers said opening in a closed position and being capable of being moved to an opened position in which said top does not cover said opening the improvement which comprises:

projecting flange means on said base and on said cap for engaging one another when said cap is in said closed position so as to hold said cap on said base,

at least one of said flange means being capable of being temporarily deformed so as to permit said cap to be assembled on said base in said closed position and so as to permit said cap to be removed from said base to said opened position,

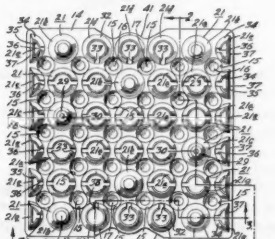
surfaces on said base and said cap which are spaced from one another when said cap is in said closed position, and fulcrum means located adjacent to one of said spaced surfaces,

said surfaces and said fulcrum means being shaped so as to permit said cap to be rotated about said fulcrum means so as to be at least partially disengage said flange means when said cap is being moved from said closed to said opened position.

3,877,599
EGG TRAY

Robert C. Morris, Trappe, Md. assignor to Multifax Corporation, Easton, Md.

Filed Aug. 3, 1973, Ser. No. 385,548
Int. Cl. B65d *25/02, 81/00, 85/00*
U.S. Cl. 217—26.5 **5 Claims**

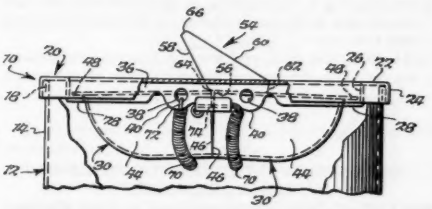


1. An egg tray comprising a base portion having a plurality of depending egg-supporting cups arranged in transverse and longitudinal rows therein, said cups being of uniform size at the top and having converging sidewalls terminating at the bottom in a closed bottom wall, said base having also upstanding projections thereon, said projections arranged in transverse and longitudinal rows intermediate the transverse and longitudinal rows of cups and staggered relative thereto whereby said projections are offset from both the longitudinal and transverse rows of cups, said upstanding projections comprising upwardly converging walls aligned with the downwardly converging walls of the cups at the points of intersection between said projections and said cups, the walls of a majority of said upstanding projections terminating at a level corresponding to the medial portion of the eggs supported in the cups and comprising frustoconical generally semicircular pairs of upstanding skirts spaced from one another to provide vertical slots therebetween for air circulation therethrough, said walls being open at the top to provide substantial air circulation around said eggs and providing convex arcuate surfaces having sufficient flexibility to cushion and resiliently support the sides of eggs of different sizes in the cups.

3,877,600
CLOSURE ASSEMBLY

Valentin E. Beil, Eden, N.Y., assignor to McDonald Products Corporation, Buffalo, N.Y.

Filed Oct. 10, 1972, Ser. No. 296,031
Int. Cl. B65d *51/18, 43/16;* **A24f** *19/00*
U.S. Cl. 220—334 **8 Claims**



3. A closure assembly for a receptacle comprising: a pair of closure sections having inner abutting edges; means for mounting said closure sections on a receptacle for pivotal movement about pivot axes betwen open and closed positions; said pivot axes extending generally parallel to said edges in closely spaced relation thereto; spring means operatively connected to said mounting means and operatively engaging said sections for normally maintaining said sections in a closed position with said edges in a tightly abutting closed relation preventing relative movement therebetween; said spring means comprising a pair of elongated springs extending across the undersides of said sections between said pivot axes and said edges in spaced relation to said edges, said springs extending in a direction generally parallel to said edges; and means for pivoting said closure sections away from each other into an open position against the force of said spring means.

3,877,601
FLOOR BOX

Thomas J. Evans, Parkersburg, W. Va.; William Walker, Belpre, Ohio, and Edward E. Hall, deceased, late of Parkersburg, W. Va. (by Lena P. Hall, administratrix), assignors to Textron Inc., Providence, R.I.

Filed Mar. 12, 1973, Ser. No. 340,276
Int. Cl. H02g *3/08;* **B65d** *7/38*
U.S. Cl. 220—3.3 **4 Claims**

1. A hollow, octagon-shaped floor box comprising:

a bottom, four long sides and four short sides each extending up from the bottom to form the hollow box, each two adjacent long sides extending perpendicular to each other with a short side extending therebetween and oriented at an obtuse angle to each long side;

each short side comprising first and second sections, the first section being an extension of one of the long sides and the second section being an extension of the other

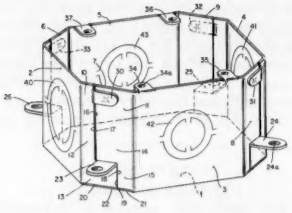
long side, also the first and second sections each being L-shaped and the edge of the leg of the first section abutting the edge of the foot of the second section and the edge of the foot of the first section abutting the edge of the leg of the second section;

a leveling lug extending outwardly from the top of said foot;

a fastening lug on the top of the first section and extending outwardly therefrom and overlapping the second section and being spot welded thereto;

a mounting lug at the top edge of said other long side and extending in to the box and generally perpendicular to the long side; and

said bottom, said sides, said leveling, fastening and mounting lugs all being integral and made from pregalvanized metal and formed on a multi-stage progressive die.

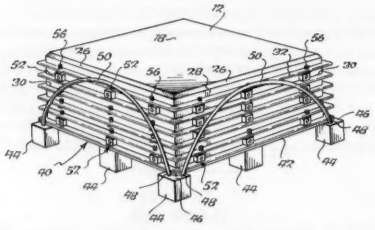


3,877,602

COLLAPSIBLE CONTAINER WITH IMPROVED FASTENER ASSEMBLIES

James E. Clark, Williamsville, and Jerol E. Kent, Clarence, both of N.Y., assignors to Clark Kent, Inc., Williamsville, N.Y.

Filed Sept. 10, 1973, Ser. No. 395,461
Int. Cl. B65d *7/00*
U.S. Cl. 220—4 R **11 Claims**



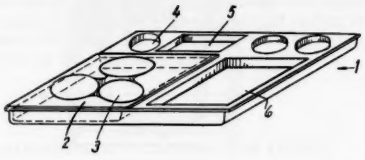
1. A container comprising: a plurality of right angularly related panel members each comprising a body of insulating material covered by a skin of plastic material; said skin of each of said panel members being formed to provide an inner wall surface and a perimeter wall surface extending normal to said inner wall surface and a beveled surface joining said inner wall surface to said perimeter wall surface; said skin terminating in a peripheral flange projecting laterally outwardly from said panel member body; the beveled surfaces of adjacent, right angularly related panel members disposed in an abutting relation with the ends of said flanges thereof being slightly spaced from each other; and means for detachably fastening adjacent edges of said right angularly related panel members together.

3,877,603

TRAY FOR SERVING MEALS

Heinz Holz, Velbert/Hannover, Germany, assignor to FKF Berlin - Fleischwaren- und Konservenfabrik Schulz & Berndt GmbH & Co. KG, Berlin, Germany

Filed July 13, 1972, Ser. No. 271,588
Claims priority, application Germany, July 13, 1971, 2135660; June 12, 1972, 2229251
Int. Cl. A47g *19/00*
U.S. Cl. 220—23.83 **11 Claims**



1. A tray for serving meals, said tray comprising, in combination:

a rigid base having an upper surface;

means defining at least one recess in the upper surface for cold foods, cutlery and the like;

a removable heat resistant holding sub-unit configured to peripherally retentively grip and hold a plurality of hot food containers as a unit; and

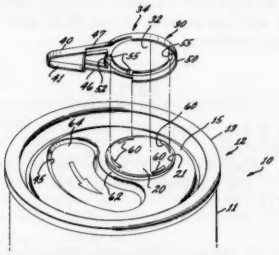
further recess defining means in said upper surface to removably accommodate said removable holding sub-unit with a plurality of such hot food containers in said sub-unit.

3,877,604

EASY OPEN ECOLOGY END

Omar L. Brown, Dayton, Ohio, assignor to Dayton Reliable Tool & Mfg., Co., Dayton, Ohio

Filed Nov. 8, 1973, Ser. No. 413,812
Int. Cl. B65d *43/02, 17/00*
U.S. Cl. 220—267 **31 Claims**



1. A container having an easy opening end comprising:

means forming a container,

cover means secured to said container and forming an end wall thereof,

panel means in said cover and forming an opening upon removal thereof,

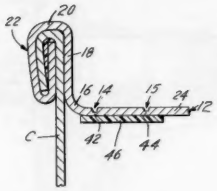
said panel means being defined by weakening means formed in said cover whereby application of force to said panel means effects removal thereof from said cover by urging said panel downwardly, and

rotatable force applying means mounted on said cover and supported thereby and cooperating with said cover and said panel for applying a downward force to said panel in response to rotation of said force applying means whereby at least a portion of weakening means is ruptured by rotation of said force applying means.

3,877,605
EASY OPENING CONTAINER WITH SAFETY EDGE COMPOUNDS

Walter A. Fourier, Crystal Lake, Ill., assignor to American Can Company, Greenwich, Conn.

Filed Sept. 19, 1973, Ser. No. 398,858
Int. Cl. A47g 19/22; B65d 17/20; C08c 11/32
U.S. Cl. 220—271 18 Claims



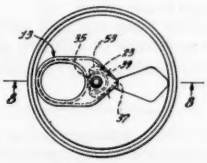
1. In a metal container wherein a full-open end closure is seamed to a container body, wherein the end closure includes a peripheral countersink wall, full-open removable central panel defined by a substantially peripheral score line and an opening tab secured to the central panel and operative upon manipulation to cause a rupture in the score to leave a rim between the countersink wall and the score, the improvement which comprises:

a safety edge compound having sufficient elongation, tear and tensile characteristics to tear without substantial fragmenting or stringing upon removal of the central panel derived from a composition having a solids content of from about 45 to about 75 percent by weight comprising a polymer mixture consisting essentially of from about 50 to about 75 percent by weight of an elastomeric polymer or mixtures thereof and from about 50 to about 25 percent by weight of a vinyl chloride polymer, liquid vehicle and filler, said compound covering the score to protect the metal edges of the removable panel section and the rim upon rupture of the score.

3,877,606
EASY OPENING CONTAINER WALL WITH RETAINED TEAR STRIP

Francis M. Silver, Dayton, Ohio, assignor to Ermal C. Fraze, Dayton, Ohio

Continuation-in-part of Ser. No. 245,940, April 20, 1972, abandoned. This application Apr. 19, 1973, Ser. No. 352,558
Int. Cl. B65d 17/20
U.S. Cl. 220—269 35 Claims



1. An easy container wall comprising:

a container wall of sheet material;

means defining a tear portion in said container wall partially removable from the container wall;

tab means joined to said tear portion and movable to partially remove said tear portion to form an opening in said container wall;

said tear portion being foldable to a folded position to form a folded tear portion of a length less than the tear portion in the unfolded position;

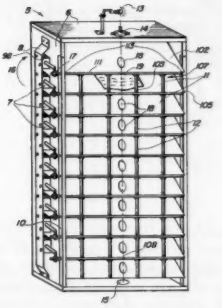
said tear portion in the folded position being located above the container wall; and

said tab means being operative in the folded position of said tear portion to cover the folded tear portion which is positioned between the container wall and the tab means.

3,877,607
ELECTRONIC COPY SENDER

James Long, Orlando, Fla., assignor to Sentinel Star Company, Orlando, Fla.

Filed July 13, 1973, Ser. No. 379,141
Int. Cl. B65h 43/08
U.S. Cl. 221—12 13 Claims



1. An electronic copy sender for sequentially distributing material comprising:

holding means for receiving and holding material for subsequent release;

releasing means for releasing material from said holding means, said releasing means having a first and a second position, said first position for preventing release of material from said holding means, and said second position for allowing release of material from said holding means;

transducer means for moving said releasing means from said first to said second position in response to an electrical signal and for moving said releasing means from said second to said first position upon termination of said electrical signal;

control means comprising an electronic circuit having a set of advancing means for advancing a series of switches, said advancing means being connected for alternate operation for sequentially selecting one of said releasing means and directing said electrical signal to the selected one of said releasing means;

signal means for sending electrical signals to the selected one of said transducer means thereby operating said releasing means, releasing material from said holding means.

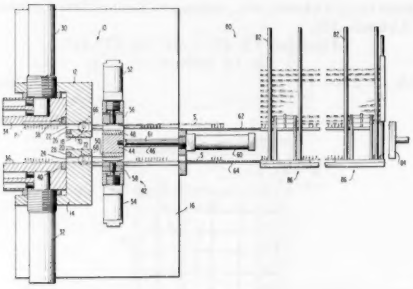
3,877,608
MAGAZINE FEED OF CONNECTOR PLATE STOCK

John Calvin Jureit, Coral Gables; Ben Kushner, Miami; Roy Leutwyler, Miami, and Adolfo Castillo, Miami, all of Fla., assignors to Automated Building Components, Inc., Miami, Fla.

Filed Dec. 27, 1973, Ser. No. 428,851
Int. Cl. B65h 5/00
U.S. Cl. 221—236 17 Claims

1. Apparatus for feeding a plurality of strips of stacked connector plate stock to a fabrication machine, each strip being formed of sheet metal with a plurality of teeth struck to project to one side thereof comprising: first and second surfaces spaced one from the other and defining first and second positions for feeding a pair of strips of connector plate stock to the machine, means for guiding the stacked strips of stock

for movement toward said first and second feed positions, means carried by said apparatus for locating a first pair of strips in said first and second feed positions respectively including means for separating the first pair of connector plate stock strips one from the other and from the stack thereof, means for restraining the stacked strips of connector plate



stock next adjacent the first pair thereof from movement toward said first and second feed positions while the first pair of strips are located in said feed positions, and means for displacing the pair of strips from said feed positions in a direction other than the direction of movement of the stacked strips toward said first and second positions for feeding the first pair of strips to the machine.

3,877,609

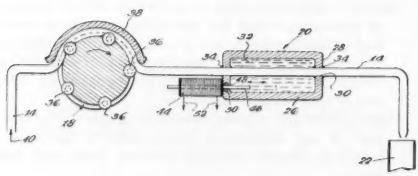
MEASURED DOSING DISPENSER UTILIZING FLOW LINE DEFORMER AND METHOD OF DISPENSING

Herbert M. Cullis, Silver Spring, Md., assignor to Baxter Laboratories, Inc., Morton Grove, Ill.

Continuation of Ser. No. 179,914, Sept. 13, 1971, abandoned. This application Oct. 23, 1973, Ser. No. 408,708

Int. Cl. B65d *37/00*

U.S. Cl. 222—1 **9 Claims**



1. A system for dispensing precisely measured volumes of liquids, comprising:

a reservoir for holding liquids;

a liquid conduit, having a dispensing port, said conduit coupled to the reservoir for receiving liquids therefrom; means coupled to the conduit for filling it with liquid and for occluding the conduit to hold a substantially static liquid column therein which column extends to the dispensing port; and

dispensing means including a housing enveloping a distortable portion of said conduit providing a closed space therearound, noncompressible fluid medium filling said space, and means for displacing a selected volume of said medium within said closed space thereby to distort said enveloped distortable portion of said conduit, whereby a precisely measured volume of fluid equal to said selected volume may be dispensed from said conduit via said port.

3,877,610

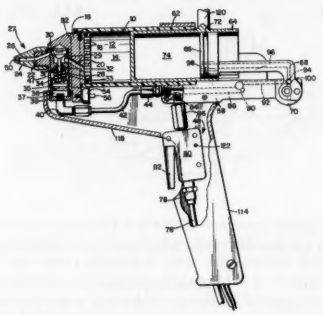
HOT MELT CARTRIDGE ADHESIVE GUN

Herbert C. Dickey, North Reading, Mass., assignor to Ornsteen Chemicals and Textiles Co., Inc., Seabrook, N.H.

Filed Feb. 1, 1974, Ser. No. 438,730

Int. Cl. B67d *5/62*

U.S. Cl. 222—146 HE **15 Claims**



1. A hot melt adhesive gun for use with a cartridge of normally solid thermoplastic adhesive, said gun comprising:

a housing of thermally insulative material defining a chamber adapted to contain a cartridge of normally solid thermoplastic adhesive and being sufficiently cool to retain said adhesive cartridge in substantially solid form;

nozzle means at the discharge end of said chamber;

heater means disposed at the discharge end of said chamber and into engagement with which said adhesive cartridge is urged to melt a confronting quantity thereof;

normally closed pneumatically actuable valve means coupled to said nozzle means;

manually actuable pneumatically operative trigger means adapted for coupling to a source of operating gas of predetermined operating pressure;

a pneumatic assembly at the end of said chamber opposite to said heater means and including:

driving means disposed for sliding movement in said chamber;

means for pneumatically coupling said trigger means to said driving means;

venting means communicating with the working atmosphere;

said trigger means being operative upon actuation to apply operating gas to said driving means to urge said means and an adhesive cartridge in said chamber into engagement with said heater means;

said trigger means being operative upon deactuation to discontinue application of operating gas to said driving means and for coupling said pneumatic assembly to said venting means.

3,877,611

COMBINATION OF A WATER GUN AND BOW

Howard J. Morrison, Deerfield, and Donald F. Nix, Hanover Park, both of Ill., assignors to Marvin Glass & Associates

Filed July 29, 1974, Ser. No. 492,527

Int. Cl. G01g *13/00*

U.S. Cl. 222—78 **6 Claims**

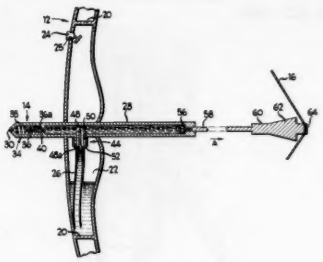
1. A bow comprising:

a fluid containing reservoir on said bow;

a firing chamber in fluid communication with the reservoir and having an ejection opening;

reciprocal plunger means mounted within the firing chamber for forcing water out through said ejection opening; and

check valve means at the ejection opening and between the reservoir and firing chamber whereby the check valve means permits at least some of the fluid from the reservoir to enter the firing chamber when the plunger means



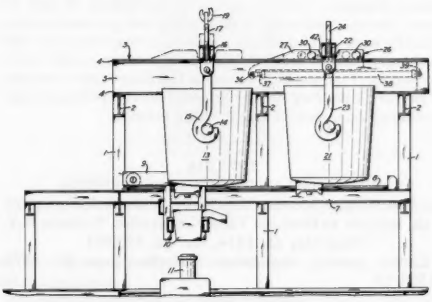
is moved by an external force in one direction to a cocked position and causes said fluid to be expelled through the ejection opening when the plunger means is moved in an opposite direction.

3,877,612

LADLE HANDLING APPARATUS FOR CONTINUOUS CASTING

Joseph Rokop, Pittsburgh, and Geoffrey W. Hughes, McMurray, both of Pa., assignors to Rokop Engineering, Pittsburgh, Pa.

Filed July 19, 1974, Ser. No. 490,118
Int. Cl. B22d *37/00*
U.S. Cl. 222—129 **10 Claims**



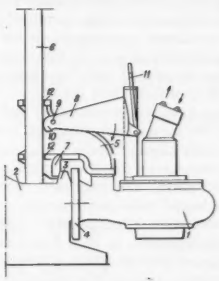
1. Continuous casting apparatus comprising a framework having a pair of spaced parallel horizontal ladel-supporting members along its top, a first ladle carrier provided with a cross beam spanning the space between said parallel members with its ends above them for suspending a ladle of molten metal below the cross beam at a pouring station, a pair of laterally spaced carriages mounted on said parallel members at a ladle stand-by station spaced from said pouring station, a second ladle carrier like said first ladle carrier with the ends of its cross beam supported on said carriages for suspending a second ladle of molten metal below that cross beam, and means for moving said carriages to shift the second ladle carrier to said pouring station after the first ladle carrier has been moved away from that station.

3,877,613

SYSTEM FOR COUPLING PUMP UNITS TO OUTLETS UNDER WATER

Jan Alfvegren, Vasterhaninge, Sweden, assignor to ITT Industries, Inc., New York, N.Y.

Filed Apr. 19, 1974, Ser. No. 462,218
Claims priority, application Sweden, Apr. 25, 1973, 057770/173
Int. Cl. B67d *5/06*
U.S. Cl. 222—180 **5 Claims**



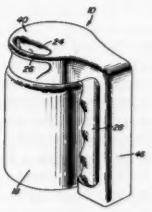
1. A locking device for submersible pumps arranged as a releasable connection between a pump unit and a generally submerged outlet pipe, comprising guide means attached to a pump unit, said guide means during lowering of a pump including means adapted to slide along a substantially vertical guide, a weight eccentrically suspended on the guide means, said weight being turnable around its point of suspension so that due to the effect of gravity it endeavors to turn around this point, said weight including a projection which, during the turning, comes into contact with the guide and thus presses the pump unit firmly against the outlet pipe.

3,877,614

NON-SPILLABLE LIQUID DISPENSING SYSTEM

Robert E. Murphy, 3001 S. Roosevelt No. 10, Boise, Idaho 83705

Filed May 22, 1973, Ser. No. 362,829
Int. Cl. B65d *37/00*
U.S. Cl. 222—209 **6 Claims**



1. A non-spillable fluid dispensing system, comprising, in combination:

a. means in the form of a tube for placing a fluid in a cavity in a container into communication with a medium surrounding the container, the pressure in the cavity being normally substantially the same as the pressure of the medium;

b. a drinking cup having a drinking lip and connected to the placing means outside of the container cavity;

c. means for selectively increasing the pressure in the cavity to a value greater than that of the medium and forcing fluid through the placing means and out of cavity into the cup, and sequentially decreasing the pressure in the container cavity and drawing fluid into the cavity from the placing means, the fluid being selectively forced into the cup from the container cavity by the pressure increasing means and from the cup into the cavity when the pressure in the cavity is less than that of the medium, the pressure increasing means including a bellows arrangeable adjacent the container for being operatively engaged by one using the container, passage means for placing the bellows in communication with the container cavity and valve means associated with the passage means for permitting a flow of fluid from the bellows to increase pressure of fluid in the container cavity and blocking flow of fluid from the cavity to the bellows, said passage means having a main passage portion and constricted passage portions connecting the main passage portion to the bellows and cavity, and said valve means being a valve element arranged in the main passage portion for moving between the constricted passage portions, said valve element dimensioned to pass freely through the main passage portion and be blocked from entering the constricted passage portions, the constricted passage portion connecting the bellows to the main passage portion being arranged at an end of the main passage portion for the valve element to block a flow from the cavity to the bellows, and the constricted passage portion connecting the cavity to the main passage portion being arranged spaced from an end of the main passage portion for permitting a flow from the bellows to the cavity; and

d. means for selectively sealing an opening of the container communicating with the cavity, the valve means being arranged in the sealing means and the bellows connected to the sealing means, with the sealing means, valve means, and bellows forming an integral unit.

5. A non-spillable fluid dispensing system, comprising, in combination:

a. means in the form of a tube for placing a fluid in a cavity in a container into communication with a medium surrounding the container, the pressure in the cavity being normally substantially the same as the pressure of the medium;

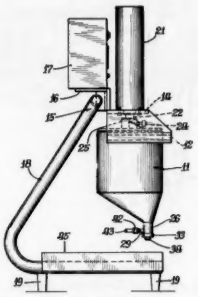
b. a drinking cup having a drinking lip and connected to the placing means outside of the container cavity; and

c. means for selectively increasing the pressure in the cavity to a value greater than that of the medium and forcing fluid through the placing means and out of cavity into the cup, and sequentially decreasing the pressure in the container cavity and drawing fluid into the cavity from the placing means, the fluid being selectively forced into the cup from the container cavity by the pressure increasing means and from the cup into the cavity when the pressure in the cavity is less than that of the medium, the pressure increasing means including a bellows arranged adjacent the container for being operatively engaged by one using the container, passage means for placing the bellows in communication with the container cavity and means associated with the passage means for permitting a flow of fluid from the bellows to increase pressure of fluid in the container cavity and blocking flow of fluid from the cavity to the bellows, the pressure increasing means including a bellows, a diaphragm arranged forming a wall of the container cavity and passage means for placing the bellows in communication with the diaphragm and permitting a flow from the bellows to expand the diaphragm and reduce the volume of the cavity with an accompanying increase in pressure, the bellows, diaphragm and passage means forming an integral unit arrangeable sealing an opening of the container communicating with the cavity.

3,877,615
PIZZA SAUSAGE DISPENSER

Richard J. Anetsberger, Northbrook, and Alfred L. Meyer, Libertyville, both of Ill., assignors to Anetsberger Brothers, Inc., Northbrook, Ill.

Filed June 1, 1973, Ser. No. 366,308
Int. Cl. G01f *11/00*
U.S. Cl. 222—263 **11 Claims**



1. In a machine for automatically serially depositing individual portions of bulk sausage on a pizza skin from a hopper by means of air from a supply of air under pressure and in response to pressure means for forcing the sausage downwardly in the hopper, a single discharge nozzle removably mounted on the lower end of said hopper for ready cleaning, said discharge nozzle including a sausage inlet and a chamber to receive one of said portions, an air blast outlet between said sausage inlet and said chamber, control means including a control member selectively operable to cause said pressure means to continuously move sausage into said discharge nozzle, a normally closed air discharge valve interconnected between said air supply and the air blast outlet in said nozzle, and a pulse timer operable in response to operation of said control member to effect successive operations of said air valve, during continuing operation of said pressure means whereby each valve operation delivers a blast of air to said discharge nozzle to sever the portion of sausage in said chamber and eject the same downwardly therefrom and a plurality of portions thus may be ejected successively during a single continuing operation of said pressure means.

3,877,616
PUMP WITH UNITARY VALVE MEMBER

Silvester William Stevens, MacQuarie Fields, N.S.W., Australia, assignor to Precision Valve Corporation, Yonkers, N.Y.

Filed May 28, 1974, Ser. No. 473,801
Claims priority, application Australia, June 26, 1973, 57357/73
Int. Cl. G01f *11/30*
U.S. Cl. 222—321 **12 Claims**

1. A dispensing pump construction for mounting on a container comprising:

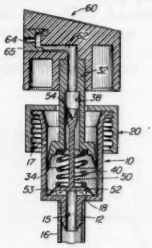
a housing having side and bottom walls defining a cylindrical interior chamber, and an inlet passage extending through the bottom wall of the housing,

means to mount the pump in the mouth aperture of a container,

a reciprocable member movable from a rest position through actuation and return strokes, said reciprocable member having a piston portion circumscribed by a resilient skirt for sliding sealed engagement with the cylindrical interior wall of the housing, a hollow stem portion coaxial with the piston portion, and an axial cylindrical outlet passage extending through the piston and stem portions,

a unitary valve member having at its lower end an inlet valve and at its upper end an outlet valve,

said inlet valve having a downwardly sloping resiliently deflectable margin biased toward sealing engagement with the interior surface of the bottom wall of the housing radially outwardly of said inlet passage,



said outlet valve having an upwardly sloping resiliently deflectable margin biased toward sliding sealed engagement with the cylindrical wall of the outlet passage of the reciprocable member, and

a return spring for biasing the reciprocable member upwardly toward the rest position of the pump.

3,877,617

PUMP WITH SLIDE VALVE

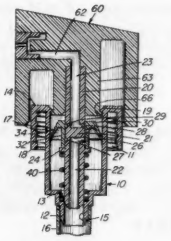
Silvester William Stevens, MacQuarie Fields, N.S.W., Australia, assignor to Precision Valve Corporation, Yonkers, N.Y.

Filed May 28, 1974, Ser. No. 473,802

Claims priority, application Australia, June 26, 1973, 57358/73

Int. Cl. G01f *11/38*

U.S. Cl. 222—321 **7 Claims**



1. A dispensing pump construction for mounting on a container comprising:

a housing having side and bottom walls defining a cylindrical interior chamber and having a bore extending through the bottom wall of the housing, said bore being in communication with the interior of the container,

means to mount the pump in the mouth aperture of a container,

a reciprocable hollow tubular stem member movable from a rest position through actuation and return strokes, said reciprocable stem member including an axial bore blocked by a medial wall to divide the bore into an upper outlet passage and a lower inlet passage, an outlet valve port extending through said stem above said medial wall and in communication with said outlet passage, and an inlet valve port extending through said stem below said medial wall and in communication with said inlet passage;

a lower portion of said stem being slidingly received in the bore through the bottom of the housing, and an upper portion of the stem extending outwardly of said housing,

a pump piston member slidingly received in said housing chamber, said piston having a central tubular sleeve portion through which said stem slides, said sleeve including inlet and outlet valve apertures located with respect to said stem inlet and outlet ports for alternate communication with said ports as said sleeve slides with respect to said stem,

stop means on said stem to limit relative motion of the piston sleeve and stem to effect alternative opening of the inlet and outlet valve ports, and

a return spring for biasing the stem toward the rest position.

3,877,618

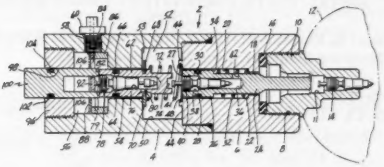
LOST MOTION FLUID MEASURING VALVE ASSEMBLY

William C. Gore, Elgin, Ill., assignor to Olin Corporation, New Haven, Conn.

Filed Mar. 25, 1974, Ser. No. 454,049

Int. Cl. G01f *11/38*

U.S. Cl. 222—402.2 **7 Claims**



3. An apparatus for providing a measured amount of a fluid under pressure from a reservoir of a bulk supply of fluid, said apparatus comprising:

a. means forming a measuring chamber for containing a predetermined volume of fluid under pressure;

b. means forming a first fluid flow passage into said measuring chamber from the fluid reservoir;

c. probe means movably mounted in said first fluid flow passage, said probe means being operable, when moved from a first position to a second position, to open the reservoir of fluid for flow of fluid therefrom into said first fluid flow passage;

d. means forming a second fluid flow passage from said measuring chamber;

e. valve means in said second fluid flow passage, said valve means being normally open to fluid flow from said measuring chamber through said second fluid flow passage; and

f. actuator means operable to close said valve means against fluid flow therethrough and to move said probe means to said second position with movement of said probe means toward said second position continuing after said valve means has been closed.

3,877,619

PNEUMATIC SELF-CLOSING VALVE FOR A TUBE OF FLOWABLE MATERIAL

Evelio F. Chavez, Jr., 211 S.W. 55th Ave., Miami, Fla. 33134

Filed May 15, 1974, Ser. No. 470,210

Int. Cl. B65d *35/38*

U.S. Cl. 222—494 **2 Claims**

1. A tube cap and in combination a pneumatic self-closing valve, said combination comprising, a tube of flowable material having a closed end and an open end, a truncated cone-shaped skirt, means to attach the skirt in closing relation of the

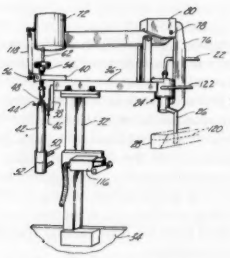
open end, the distal end of said skirt having an opening, said skirt including an internal septum defining an inner chamber and an outer chamber within the skirt, said septum having a hole separating the chambers, said outer chamber being in open communication with said skirt opening and the interior of said skirt about said septum, a figure of **8** inflated member of rubbery deformable material defining a first ball and a second ball and an intermediate neck connecting said balls, said first ball being in said outer chamber and with its peripheral surface normally blocking said skirt opening and said second ball being in said inner chamber with said neck extending through said hole, whereby when the tube is squeezed, pressure within the tube and outer chamber will cause the first ball to be deformed and the second ball to expand in said inner chamber so long as pressure is applied so that the flowable material may be squeezed from the tube and, when the pressure is relaxed, the outer ball will again seat and close the opening of said skirt.

3,877,620

METAL VALVE FOR BATTERY GRID CASTING MACHINE

Robert R. Rader, Port Huron, Mich., assignor to Wirtz Manufacturing Company, Inc., Port Huron, Mich.

Filed Jan. 23, 1974, Ser. No. 435,830
Int. Cl. B22d *37/00*
U.S. Cl. 222—537 **15 Claims**



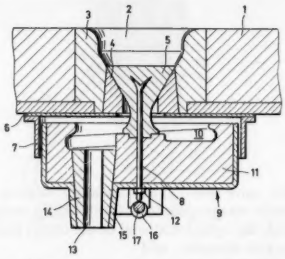
1. In a battery grid casting machine of the type wherein a mold is opened and closed with each cycle of the machine, a valve for dispensing molten metal to a mold filling ladle comprising, upper and lower tubular housings having their central axes extending generally vertically in generally coaxially aligned relation, the lower end of said upper housing and the upper end of said lower housing being in open communication with one another and telescopically engaged, one of said housings being supported in fixed position on the machine and the other being mounted on the machine for vertical movement, means for shifting said movable housing vertically, said upper housing having a bore therein which opens vertically downwardly, said bore terminating at its lower end in an annular valve seat which is generally co-axial with said upper housing, said valve seat being disposed below said upper end of said lower housing, an inlet conduit for molten metal connected with said bore, said lower housing having an upstanding pedestal therein, said pedestal having a generally flat upper end face lying in the plane perpendicular to the axis of said housing, a spherical ball resting on said upper end face of said pedestal and being free to roll laterally thereon to a limited extent so as to readily align itself concentrically and seal with said annular valve seat when said movable housing is shifted vertically in a direction which moves said ball and valve seat relatively toward each other, means forming a molten metal outlet in said lower housing at a level below said ball whereby, when said movable housing is shifted vertically to unseat said ball, the molten metal flows downwardly by gravity through said outlet means, and an open cage surrounding said ball and limiting the lateral excursion thereof on said pedestal to a distance less than the radius of said valve seat.

3,877,621

SLIDING PLUG FOR A MOLTEN METAL CONTAINER

Rolf Seybold, Solingen, Germany, assignor to Egon Evertz, Solingen, Germany

Filed Oct. 17, 1973, Ser. No. 407,081
Claims priority, application Germany, Oct. 20, 1972, 2251484
Int. Cl. B22d *37/00*
U.S. Cl. 222—559 **10 Claims**



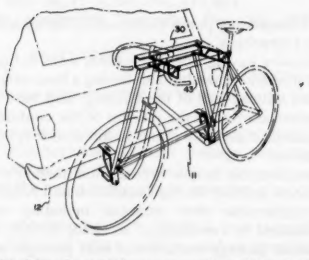
1. A plug for a casting ladle having a surface defining a bottom orifice, said plug comprising a guide which is mounted on the exterior of the base of the ladle, a refractory part which is movably mounted on the ladle for movement relative to the guide between a first position closing said bottom orifice and a second position opening said bottom orifice, a refractory sealing body, said refractory part being connected to said refractory sealing body and being movable in a substantially vertical direction, said sealing body being arranged so that in the first closing position its peripheral surface sealingly engages said surface on the ladle defining said bottom orifice and in the second opening position it permits the flow of metal through said bottom orifice, and a closing chamber formed in said plug, the cross-section of said closing chamber being greater than the cross-section of said bottom orifice, said closing chamber having an exit orifice in the bottom portion thereof which is laterally offset from said bottom orifice.

3,877,622

FOLDABLE BICYCLE RACK

Perry E. McLain, Sacramento, Calif., assignor to Daniel E. McDonald and Terrance I. Espeland

Filed Sept. 27, 1972, Ser. No. 292,745
Int. Cl. B60r *9/10*
U.S. Cl. 224—42.03 B **12 Claims**



11. A foldable bicycle rack for transporting a bicycle having a framework and having a framework bar extending longitudinally thereof, said rack adapted to be mounted on a vehicle having a bumper, comprising a base assembly, means for affixing said base assembly to the bumper, a top plate member formed of an open channel section having a length less than

said base assembly, and having two sets of overlying spaced holes in the sides of said channel section, a bicycle hanger pivotally mounted in each set of said spaced holes for movement between a folded position adjacent the base of said channel and an unfolded position perpendicular thereto, a plurality of upright support members each of which is pivotally attached at its opposite ends to both the top plate member and the base assembly, and locking means for preventing pivoting of said support members, said top plate, base assembly and support member combination movable between an unfolded carrying configuration and a folded stored configuration.

3,877,623

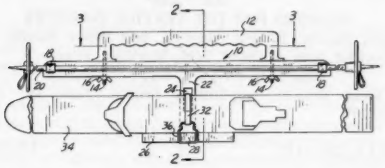
CARRIER FOR SKI EQUIPMENT

Richard V. Breault, Lake Orion, Mich.

Filed Oct. 4, 1973, Ser. No. 403,500

Int. Cl. B65d *71/00, 63/00*

U.S. Cl. 224—45 S **4 Claims**



1. A carrier for skis and ski poles comprising an elongated member, at least one downwardly extending leg on the elongated member, a transverse foot on the downwardly extending leg for supporting the skis, a resilient strap on the downwardly extending leg, a buckle on each end of the resilient strap for entering into a holding engagement with the transverse foot on the downwardly extending leg, clamping means on the elongated member for releasably holding the ski poles, and a carrying handle on the elongated member.

3,877,624

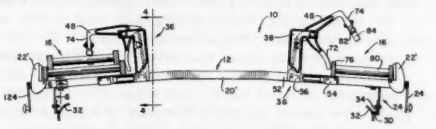
VEHICLE TOP RACK

Miles Thomas Carson, 1120 10th St., Denver, Colo. 80204

Filed May 13, 1974, Ser. No. 469,603

Int. Cl. B60m *9/04*

U.S. Cl. 224—42.1 F **7 Claims**



1. A vehicle top elongate object transporting structure comprising:

at least a pair of bows, each of said bows having means for attaching said bows to the top of a vehicle in logitudinally spaced relation;

each of said bows having an upstranding stop member immovably mounted at at least one end thereof; and

at least one of said bows mounting a transversely movable clamp member comprising:

a. a crank mounted for rotation in the end of said bow;

b. a lead screw mounted for rotation in said bow and engageable by said crank;

c. a slide frame engaging the bow and forming a part of the movable clamp member;

d. a threaded follower engaging the lead screw and mounted in said slide frame;

e. a generally U-shaped clamp arm having first and second legs; means pivotally mounting the clamp arm to the movable slide frame such that the legs of the arm generally depend toward the bow;

f. a spring having one connected to the slide frame and the other end connected under tension to the U-shaped clamp arm adjacent the first leg to urge the first and second legs thereof away from the bow and about the pivotal connection between the clamp arm and the slide frame, so as to be pivoted in the opposite direction against the urging of the spring by contact of the first leg by an edge of an elongate object to be clamped to the bow when the slide frame is urged toward the elongate member;

g. foot means carried by the free end of the second leg to engage the top surface of the elongate object to be transported when the clamp arm is in the clamping position;

h. wherein movement of said slide frame towards the stop brings said first leg into engagement with the elongated object and causes the U-shaped clamp to be pivoted, continued movement of the slide frame continues pivoting of the U-shaped clamp until the foot means carried by the second leg engages the upper surface of the elongated object to thereby effectively clamp the object against vertical and horizontal movement.

3,877,625

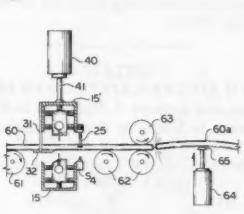
SEVERING PROCEDURE AND APPARATUS FOR PLASTIC MATERIAL

Reginald L. Brock, Rt. No. 44, Salisbury, Conn. 06068

Filed June 4, 1973, Ser. No. 366,734

Int. Cl. B26f *3/00*

U.S. Cl. 225—2 **11 Claims**



1. In a method of providing separate pieces from a body of solidified thermoplastic resin material which comprises, advancing the material into a cutting-off position, moving a pair of cutting blades into opposed engagement with opposite sides of the material and simultaneously applying opposed cutting-in blade pressure while flexing the resin material and applying melting heat along blade-engaging lines on the material to form opposed cut-in recesses extending from opposite sides of the material, releasing the blade pressure and returning the blades to their starting relationship with respect to the resin material, thereafter cooling and completing separation of a piece of the material from the body along the cut-in recesses.

3,877,626

APPARATUS FOR CUTTING A CONTINUOUS ELEMENT OF INDETERMINATE LENGTH INTO PREDETERMINED LENGTHS

William Hackemann, and Charles Gwin Renegar, both of Shelbyville, Tenn., assignors to National Acceptance Company of America, Chicago, Ill.

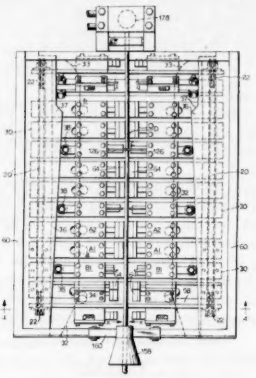
Filed May 21, 1974, Ser. No. 472,071

Int. Cl. B65h *35/00*

U.S. Cl. 225—96.5 **20 Claims**

1. Apparatus for cutting a continuous element of indeterminate length into predetermined lengths, the apparatus comprising a pair of transversely spaced, endless chains having the top reaches of the chains lying in one plane and the bottom reaches lying in a second plane, a plurality of crossplates

connected to and extending between the chains, clamping means and cutting means mounted on the crossplates, the clamping means and cutting means each being mounted for movement in the direction of the length of a crossplate, a clamping cam for actuating the clamping means, the clamping



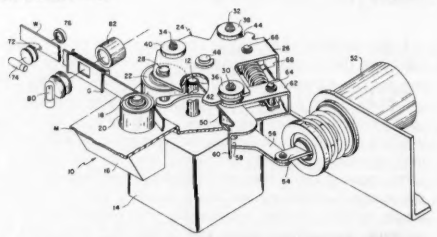
means having a cam follower associated therewith cooperable with the clamping cam, and a cutting cam for actuating the cutting means, the cutting means having a cam follower associated therewith cooperable with the cutting cam, the clamping and cutting cams extending generally in the direction of the length of the chains.

3,877,627

PINCH ROLLER/CAPSTAN WEB DRIVE

Elmer E. Boase, and Anthony P. Di Fulvio, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 26, 1973, Ser. No. 410,080
Int. Cl. B65h *17/20*
U.S. Cl. 226—33 **5 Claims**



4. Apparatus for controlling movement of a web along a predetermined path to stop a particular area of said web at a selected location, said web being of the type having a series of particular area identifying indicia, said apparatus comprising:

a pinch roller movable between an operative web engaging and driving position adjacent said web path and a second position spaced therefrom;

an idler roller positioned at the opposite side of said web path and adapted to sandwich a web between said pinch roller and said idler roller when said pinch roller is in its operative position;

drive means for selectively actuating said pinch roller to establish movement of said web when said pinch roller is in its operative position, said drive means including a capstan operatively engaged with said pinch roller and a motor for selectively rotating said capstan;

means adapted for scanning said web indicia and generating a signal upon detection of a preselected indicia indicative of a particular area of said web, said means being located a specific distance from said selected location;

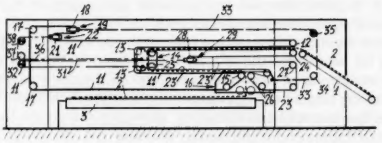
means for receiving said signal and determining the further operating time of said motor after receipt of said signal whereby to stop said capstan at the end of such time, such time being correlated to the diameter of said capstan such that drive of said pinch roller from receipt of said signal by said signal receiving means to stoppage of said motor will result in linear movement of said web equal to the specific distance between said scanning means and said selected location; and further, when said pinch roller is in its operative position, the axis of said pinch roller will be parallel to the axes of said capstan and idler roller and upstream, relative to said web path, of an imaginary line drawn between the capstan and idler roller axes so that any downstream tension inducing forces on said web after the drive thereof has stopped will urge said pinch roller toward said idler roller.

3,877,628

WEBBERS FOR THE TEXTILE INDUSTRY

Robert Asselin, 10, rue Magenta, and Pierre Asselin, Rue Romelot, both of Elbeuf, Seine Maritime, France

Filed June 19, 1974, Ser. No. 480,927
Claims priority, application France, June 19, 1973, 73.22277
Int. Cl. B65h *17/42*
U.S. Cl. 226—113 **15 Claims**



1. A webber for folding a fleece delivered by a card to convert it into a web of different thickness from the fleece, the webber comprising:

a fleece feed system;

first and second main carriages;

rollers on said first and second main carriages;

first and second endless guide means carried on said rollers for receiving the fleece leaving said feed system and moving the fleece along a loop-like path;

main carriage drive means operative to impart to said main carriages periodic linear reciprocations in parallel directions;

guide drive means operative to impart to the guide means a speed of movement relative to said main carriages;

a delivery belt arranged to receive the fleece leaving the guide means; and

delivery drive means operative to impart to the delivery belt a continuous rectilinear motion in a direction substantially perpendicular to the direction of movement of said main carriages;

in which webber the improvement comprises:

at least one auxiliary carriage;

rollers on said auxiliary carriage carrying said guide means;

auxiliary carriage drive means operative to impart to said auxiliary carriage a periodic rectilinear reciprocation in a direction parallel to the direction of movement of said main carriages;

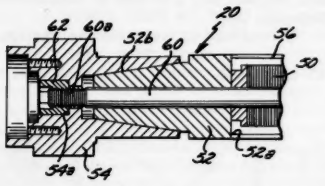
said guide means comprising first and second continuous endless guide belts running on said rollers of said first and second main carriages and said auxiliary carriage;

said rollers being so disposed that the loop-like path along which the fleece travels extends between portions of each of said first and second guide belts.

3,877,629
HIGH SPEED ROTOR FOR FRICTION WELDING SYSTEMS

Johan A. Louw, Orange, and Robert E. Ghiselin, Newport, both of Calif., assignors to Textron Inc., Santa Ana, Calif.

Filed Oct. 16, 1972, Ser. No. 298,177
Int. Cl. B23k *27/00*; **H02k** *17/18, 17/22*
U.S. Cl. 228—2 **4 Claims**

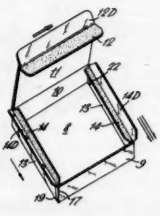


1. A friction welding system comprising in combination, an induction motor having a stator and a high speed rotor adapted to retain and rotate a first workpiece at approximately 70,000 to 100,000 revolutions per minute, a rectilinearly movable chuck assembly operable to retain a second workpiece and to move the same into engagement with said first workpiece, said rotor of said induction motor having a plurality of relatively soft iron laminations contiguously arranged and a rotor end assembly at each end thereof, each of said end assemblies comprising an end member adjacent said laminations in contiguous relation therewith and formed with an outwardly extending frusto-conical surface and a bearing member formed with a complementally shaped surface for mating with said frusto-conical surface and having an external annular bearing surface, and means operatively associated with said laminations and end assemblies to apply thereto a relatively high compression to cause said bearing members to be drawn toward each other to urge each pair of mating frusto-conical surfaces into tight mating engagement and said laminations therewith into high compression engagement to be structural members tending to prevent bending of said rotor during high speed rotation on said annular bearing surfaces.

3,877,630
METHOD AND BLANK FOR FORMING A PACKAGE WITHIN A WRAPPING

Stanley M. Silver, London, England, assignor to Paxall, Inc., Chicago, Ill.

Filed Dec. 18, 1972, Ser. No. 316,238
Claims priority, application United Kingdom, Jan. 19, 1972, 2518/72; Jan. 28, 1972, 3995/72
Int. Cl. B65d *5/40, 5/56*; **B32b** *31/26*
U.S. Cl. 229—14 BL **13 Claims**



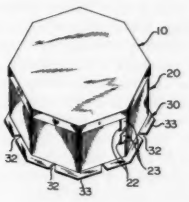
1. A method for forming an overwrapped package, of the character described, comprising the steps of forming a blank having foldable portions, said blank including a substratum formed of substantially stiff package forming material and a moisture resistant sheeting having self-adhering surfaces, delaminably secured to said substratum by a moisture resistant heat weakenable laminant, delaminating at least one foldable area of the blank under the influence of heat to strip the sheeting from the substratum thereof, folding said stripped substratum area to a selected position, away from its delaminated sheeting, and thereafter folding the stripped sheeting over and adhering it to the sheeting portion of another blank area on the exterior thereof, to thereby form a sheeting to sheeting seal between said stripped sheeting and said sheeting portion.

5. A blank for forming an overwrapped package of the character described comprising a substratum ply of substantially stiff package forming material and a sheeting ply overlying said substratum and secured thereto by a moisture-resistant heat-weakenable laminant material, whereby said sheeting is delaminable from said substratum by the application of heat, said blank including wall panels pre-creased for folding away from a delaminated portion of said sheeting, at least one area of the sheeting on said blank being severed from the remainder thereof and detachable from the rest of said blank upon delamination.

3,877,631
PAPER CONTAINER

Tsu-Yu Lai, 170, Alley 31, Lane 261, Hsi-Yuan Road, Sec. 2, and Kuo-Neng Chien, 4th Floor, No. 27, Lane 160, Hsing Seng South Road, Sec. 1, both of Taipei, Taiwan

Filed Sept. 12, 1973, Ser. No. 396,549
Int. Cl. B65d *13/04*
U.S. Cl. 229—41 C **4 Claims**



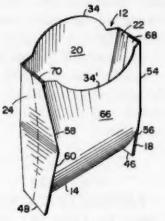
1. An assembly for making a container for cake and the like, comprising an elongate paper blank having a plurality of parallel fold lines therein extending parallel to a pair of opposite end edges thereof, said blank having slots and cooperating tabs at the opposite end edges thereof whereby the blank may be folded at the fold lines and the tabs and slots interlocked to define a sleeve, a pair of end blanks each having a main portion and a plurality of peripheral flaps thereon at the side edges thereof, each flap joined along a fold line at the side edge thereof to the main portion and having a further fold line spaced between the side edges thereof and extending parallel to the side edges and defining a pair of flap sections, a pair of locking tab means projecting from at least one end edge of the flaps, whereby the flaps may be folded about the fold lines inwardly toward the main portion with the flap sections contiguous to one another and perpendicular to the plane of the main portion, one of the tab means of one flap received behind the flap sections of an adjacent flap and the other tab means of said one flap received between the flap sections of said adjacent flap, to define an upstanding peripheral wall secured only by the interlocked tab means and flaps, one of said end blanks having a bottom plate secured thereto on the side thereof opposite the peripheral wall and having edge portions projecting outwardly beyond said wall, the peripheral wall of said one end blank having a size such as to be received in one end of the sleeve with said one end of the sleeve supported on the outwardly projecting edge portion of the bottom plate, and the peripheral wall of the other end blank having a

size such as to receive the other end of the sleeve therein, said sleeve being foldable to a collapsed position and the end blanks cooperable with one another to define a container for the collapsed sleeve.

3,877,632
SCOOP TYPE CONTAINER

Thomas C. Steel, Glen Ellyn, Ill., assignor to Federal Paper Board Company, Inc., Montvale, N.J.

Filed Feb. 7, 1974, Ser. No. 440,307
Int. Cl. B68d *5/36*
U.S. Cl. 229—41 B **11 Claims**

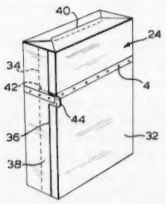


1. A collapsible container formed from a paperboard blank which is cut and scored to provide, when opened up, front and back wall forming panels and side wall forming panels, said front and back wall panels having side edge portions connected to said side wall forming panels on hinge lines having top and bottom sections converging inwardly so that said side wall panels are bowed inwardly into a locked position, said front and back wall panels having bottom portions curved inwardly to a hinge connection which extends between the side wall panels, thereby forming the bottom wall of the container, said front and back wall bottom panel portions having side edge portions cut free of the bottom portions of the front and back edges of said side wall forming panels, said side wall panels having vertically extending hinge forming center score lines which are in the plane of the front and back wall bottom hinge connection so as to enable the side wall panels to fold outwardly upon themselves and permit collapse of the front and back wall panels upon each other.

3,877,633
TEAR STRIP FOR PACKAGES

Christopher Peck, 189 Church St., Toronto, Ontario, and George A. Skinner, 525 South Dr., Winnipeg, Manitoba, both of Canada

Filed May 23, 1973, Ser. No. 362,896
Int. Cl. B65d *3/54*
U.S. Cl. 229—51 AS **10 Claims**

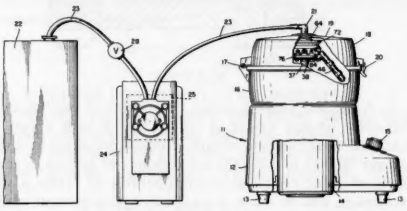


1. In a package having a tearable wrapping, an improved tear strip comprising a thin, elongated strip of material having a plurality of small, longitudinally spaced apart thickened portions, said strip extending along the interior of said wrapping and one side of said strip being adhered to said wrapping at least at said thickened portions, one end of said strip projecting from said wrapping, so that said strip may be pulled to tear said wrapping and to remove said wrapping from said package.

3,877,634
CELL WASHING CENTRIFUGE APPARATUS AND SYSTEM

Vernon C. Rohde, Newtown, and Josef Blum, Norwalk, both of Conn., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed May 25, 1973, Ser. No. 364,150
Int. Cl. B04b *15/02*
U.S. Cl. 233—14 R **19 Claims**

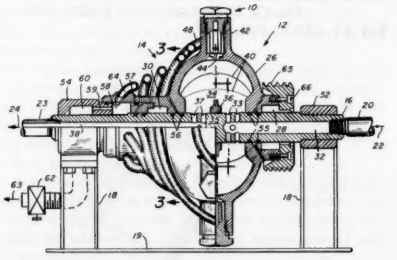


1. A system for treating biological materials and the like, comprising: a swinging tube centrifuge having a rotor, a plurality of swinging tube holders mounted on said rotor for holding centrifuge tubes, and a variable speed drive for said rotor; a distributor mounted on and rotating with said centrifuge, said distributor having a plurality of spaced, radially extending nozzles equal in number to said tube holders, said nozzles being aligned with but unconnected to said tube holders, said tube holders being pivotally mounted on said rotor so that the mouth of the centrifuge tubes held by said swinging tube holders is brought into close proximity with said nozzles when said rotor is in high speed rotation; a source of treatment fluid; tube means connected between said source and said distributor for transmitting said fluid to said distributor; and pulsing pump means operating upon an exterior portion of said tube means for urging said fluid from said source to said distributor.

3,877,635
CENTRIFUGAL SEPARATOR WITH VELOCITY REDUCER

Robert G. Donkin, 5408 E. 38 St., Tulsa, Okla. 74135

Filed Jan. 2, 1973, Ser. No. 320,132
Int. Cl. B04b *1/12*
U.S. Cl. 233—30 **3 Claims**



1. A self-contained, single chambered, centrifugal separator, comprising:

a. a hollow stationary shaft means and means to support said stationary shaft;

b. a chamber in the shape of a figure of revolution rotatable in bearings on and sealed about said stationary shaft, a

plurality of spaced vanes inside said chamber, which are part of said chamber and independent of said shaft and means to rotate said chamber about said stationary shaft;

c. a plurality of peripheral openings spaced circumferentially about said chamber;

d. means to introduce a fluid mixture, to be separated, through said hollow stationary shaft into the inside of said chamber at its smallest radius;

e. conversion means to accept fluid flowing out of said peripheral openings and to convert its velocity head to pressure head;

f. a plurality of conduits which are in the form of spirals which enclose the center of rotation of the device, directed at their outer ends in the direction of rotation of said chamber, respectively connected to said plurality of conversion means, said spiral conduits sealably connected at their inner ends to an annular collection chamber rotating as part of said chamber about said stationary shaft, said annular collection chamber forming the discharge of the high density fluid component, whereby said fluids are fully enclosed throughout their flow through said separator; and

g. means to remove the low density fluid component from said chamber at its smallest radius through said hollow stationary shaft.

3,877,636

AUTOMATIC STARTING DEVICE FOR PLANT

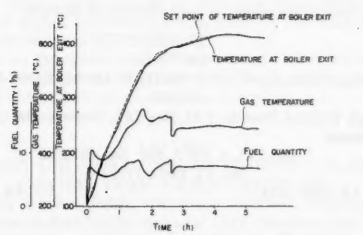
Yoshio Sato, Hitachi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 15, 1974, Ser. No. 433,502

Claims priority, application Japan, Jan. 16, 1973, 48-6628; May 21, 1973, 48-55643; July 9, 1973, 48-76637

Int. Cl. F23n *1/08*

U.S. Cl. 236—14 **12 Claims**



1. A plant automatic starting device, which has means for controlling a fluid pressure at the exit of a plant so as to be maintained constant and a heat change function, characterized in that said device comprises:

a temperature deriving means for sampling a fluid temperature at the exit of the plant at a given cycle and feeding same as an input;

means for estimating the fluid temperature at the exit of the plant *n* sampling cycles after, by using an enthalpy which is possessed by the fluid pressure at the exit of the plant and corresponds to the output at the time of present sampling;

means for setting a given rate of temperature rise for the fluid temperature at the exit of the plant;

means for obtaining a target temperature of the fluid at the exit of the plant *n* sampling cycles after, from the rate of temperature rise and the initial value of the target value of the fluid temperature at the exit of the plant; and

an adjusting means for controlling the total heat to be fed to the plant, commensurate to the deviation of the target temperatures from the estimated temperatures of the aforesaid means.

3,877,637

AUTOMATIC TEMPERATURE AND HUMIDITY REGULATING APPARATUS

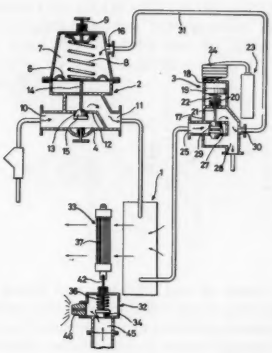
Hisashi Motoyama, No. 3-5, Ebara 7-chome, Sinagawa-ku, Tokyo, Japan

Filed Mar. 15, 1973, Ser. No. 341,573

Claims priority, application Japan, Apr. 1, 1972, 47-32742; Apr. 1, 1972, 47-32743

Int. Cl. G05d *23/02, 22/00*

U.S. Cl. 236—44 C **6 Claims**



1. An automatic temperature and humidity regulating apparatus comprising a heat exchanger, a differential presssure regulating valve at an inlet side of said heat exchanger, said differential pressure regulating valve having an upper part and a lower part, a flexible means in said upper part dividing the latter into an upper section and a lower section, a spring in said upper section biasing said flexible means in a direction to open the differential pressure regulating valve, a valve stem connected to said flexible means, said valve stem extending from said lower section into said lower part, a valve element on said valve stem disposed in said lower part, a temperature compensating valve at an outlet side of said heat exchanger, said temperature compensating valve having a temperature sensing sleeve having fluid therein, piston means on said temperature compensating valve operable to move up and down and control said temperature compensating valve according to the expansion of said fluid in said sensing sleeve, said temperature compensating valve having an outlet, and conduit means between said outlet of said temperature compensating valve and said upper section of said upper part of said differential pressure regulating valve, whereby said conduit transmits the outlet pressure of said temperature compensating valve to said differential pressure regulating valve to effect control of the latter, and a humidity control valve having a humidity detecting device in the ventilating path of said heat exchanger.

3,877,638

TEMPERATURE CONTROLLING APPARATUS FOR AUTOMATIC AIR CONDITIONING

Matsuo Amano, Hitachi; Ichiro Kimura, Mito; Tosikatsu Ito, Ibaraki, and Katsuo Kanemoto, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 5, 1973, Ser. No. 403,833

Int. Cl. B60h *1/04*; **G05b** *11/32*; **G05d** *23/275*

U.S. Cl. 237—2 A **7 Claims**

1. A temperature controlling apparatus for automatic air conditioning comprising:

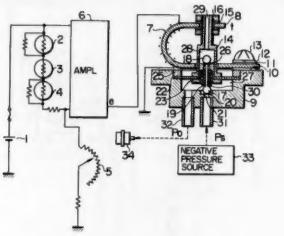
means for detecting the temperature of at least one place and providing an electric output corresponding to that temperature;

means for generating heat in response to said electric output;

means displaceable in response to the heat from said heat generating means and a temperature in the surroundings of the apparatus;

a source of gas pressure;

an output pressure chamber communicated with said source by a first communicating means, said output pressure chamber being defined in part by movable means movable in substantially the same direction as that of the pressure which acts upon the internal surface of said



movable means of said chamber, and having a second communicating means for communicating said chamber with an actuator operated by the pressure from the chamber and passage means communicating with the atmosphere;

means for transmitting the displacement of said displaceable means to said movable means; and

means for controlling at least one of said first communicating means and said passage means so as to restore said movable means when displaced in response to said displaceable means.

3,877,639

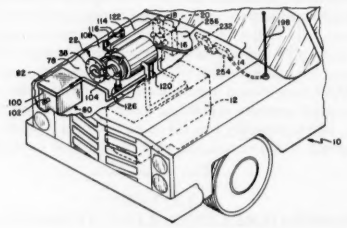
AUXILIARY AUTOMOBILE HEATER

Charles T. Wilson, 2765 N.E. 207th St., North Miama, Fla. 33160, and George P. Wilson, 121 N. Fountain, Wichita, Kans. 67208

Continuation of Ser. No. 253,467, May 15, 1972, abandoned. This application May 24, 1974, Ser. No. 472,937

Int. Cl. B60h *1/22*

U.S. Cl. 237—12.3 C **12 Claims**



1. In an automobile having an electric storage battery and a conventional liquid engine coolant system that includes a liquid circulation loop through the engine and in which loop is disposed a liquid-air heater exchanger for heating air moved therethrough by an electric fan, the combination therewith of an electrically operated gasoline burner means for heating liquid in said loop, electrically actuated pump means for circulating liquid heated by the burner means through the liquidair heat exchanger to the engine, whereby heat is delivered to the heat exchanger and to the engine by circulated liquid, and control means for concurrently operating the burner means and electrically energizing the pump means from the battery, said control means including means for initiating operation of the burner means and means for thereafter maintaining the burner means in operation for a predetermined time interval, said last means including a direct current actuated electrical timer means connected to said battery for energization.

3,877,640

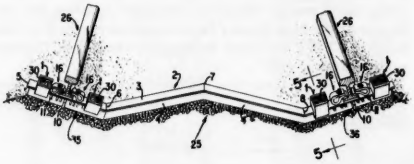
RAILROAD CROSS SUPPORTS AND PROCESS FOR MAINTENANCE OF TRACK BED

Raghuram Shripad Hemmady, Satyabhama Nivas Vithalbhai Patel Rd., Bombay-4 Maharashtra, India

Filed July 18, 1974, Ser. No. 489,520

Int. Cl. E01b *1/00*

U.S. Cl. 238—2 **14 Claims**



1. A cross support for a continuous rail or beam carrying moving, vibratory or other dynamic loads comprising a cross tie or sleeper adapted to be mounted on a ballast bed and having bearing areas near the top of said ballast bed; bottomless troughs carrying stone chips and the like and positioned so as to encompass said cross tie or sleeper adjacent to said bearing areas and adapted to feed said chips into the gaps in said ballast bed when vibrated; electrically insulated elastic fasteners on each of said bearing areas capable of providing permanent pressure for holding a rail or beam in an electrically insulated position on said cross tie or sleeper.

3,877,641

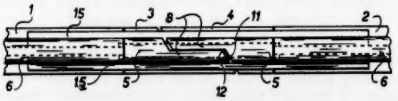
RAIL FISH JOINT AND METHOD OF MAKING THE SAME

Joseph Rolland Plourde, P.O. Box 217, Victoriaville, Quebec, Canada

Filed Oct. 1, 1973, Ser. No. 402,350

Int. Cl. E01b *11/02*

U.S. Cl. 238—234 **10 Claims**



1. A rail fish joint adapted to be connected between a first rail end and a second rail end spaced apart and arranged end to end relative to each other, said fish joint comprising a first and a second rail joint member, each having a first end portion adapted to abut against one of said rail ends and having a first head portion of normal rail width and the opposite end portion consisting of a lapping portion having a second head portion of reduced width, said lapping portion being constructed and arranged to laterally overlap the lapping portion of the other rail joint member, said lapping portions making contact along three surfaces which appear piecewise linear and continuous when seen in plan view, the second of said surfaces being parallel to the length of the rail and the other two said surfaces being oblique to said rail joint members and parallel to each other and joining in lateral transition said second surface to the outer edges of said rail joint members, said fish joint further comprising a pair of fishplates adapted to be positioned on opposite sides of said rail joint members, one of said fish-

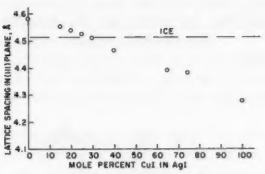
plates being rigidly secured to said first rail end and also rigidly secured to the first rail joint member abutting the latter for preventing bodily displacement between the first rail end and the first rail joint member and also secured to said second rail end and to said second rail joint member for allowing sliding displacement with respect to the second rail end and the second rail joint member alongside thereof, and the other of said fishplates being rigidly secured to said second rail end and also rigidly secured to said second rail joint member for preventing bodily displacement between the second rail end and the second rail joint member and also secured to said first rail end and to said first rail joint member for allowing sliding displacement with respect to said first rail end and said first rail joint member alongside thereof.

3,877,642

FREEZING NUCLEANT

Bernard Vonnegut, Albany, N.Y.; Henry Chessin, Chicago, Ill., and Richard E. Passarelli, Jr., Schenectady, N.Y., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 9, 1974, Ser. No. 496,438
Int. Cl. A01g *15/00*
U.S. Cl. 239—2 R **8 Claims**



1. A method of nucleating ice formation by cloud seeding nuclei at higher temperatures than those for the nuclei normally present naturally comprising:

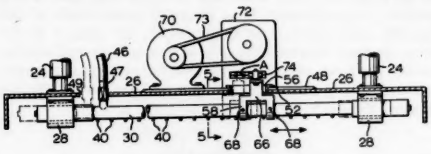
reducing the lattice misfit between ice and silver iodide by substituting other metallic atoms for a portion of the silver atoms in the silver iodide lattice.

3,877,643

METHOD AND APPARATUS FOR REMOVING RUBBER COATING FROM AIRPORT RUNWAYS

Roderick William Smith, 730 Glenleven Cres., Mississauga, Ontario; Robert George McEwen, 1137 Manning Cres., Fort Erie, Ontario, and Douglas Leslie Fraser, 689 Marley Rd., Burlington, Ontario, all of Canada

Filed Oct. 24, 1972, Ser. No. 300,214
Claims priority, application Canada, June 27, 1972, 145771
Int. Cl. B05b *9/02*
U.S. Cl. 239—102 **3 Claims**



1. An apparatus for removing the rubber coating deposited on the surface of an airport runway by the tires of an aircraft comprising

a spray conduit;

b. a plurality of solid stream **0°** to **15°** nozzles mounted on and spaced longutidinally of said conduit to form a plurality of parallel side by side discharge passages opening from said conduit;

c. input passage means opening into said conduit and connectable to a source of high pressure water;

d. means for mounting said conduit on a movable vehicle so as to direct the discharge of the nozzles to impinge onto the surface to be cleaned at an angle in the range of **0°** to **35°** to the vertical plane and

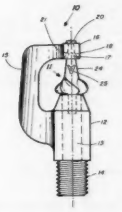
e. means for reciprocally driving said conduit longitudinally of itself a distance at least equal to the longitudinal distance between adjacent nozzles.

3,877,644

SPRINKLER HEAD AND GAME APPARATUS

Haggie I. Cockman, P.O. Box 1600, Sanford, Fla. 32771

Filed Aug. 10, 1973, Ser. No. 387,491
Int. Cl. B05b *3/04*
U.S. Cl. 239—118 **3 Claims**



1. A sprinkler head and game apparatus comprising in combination:

a. a sprinkler head body portion having attachment means for attaching said sprinkler head body to a water source and nozzle means for directing water from said sprinkler head body;

b. rotatable water deflector member removably attached to said sprinkler head body at the head of said nozzle, said deflector member having vanes therein and being rotatable by the water directed against said cover by said nozzle means, said deflector member being adapted to deflect water in a predetermined pattern;

c. said deflector member being shaped like a toy for spinning on a surface when removed from said sprinkler head body portion and having a plurality of indicia located on a plurality of facets thereon whereby a game of chance may be played by spinning said deflector member like a top, to determine which indicia on said deflector member lands facing up when said deflector member stops spinning; and

d. said rotatable water deflector member having a cylindrical extension extending into the nozzle means of said sprinkler head body and said sprinkler head body having a top deflector member engaging cup for engaging the nose tip of said deflector member when water pressure is applied through said nozzle to said deflector member thereby lifting said deflector member and cleaning out said nozzle or grit, or the like.

3,877,645

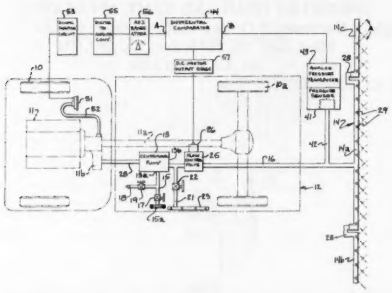
APPARATUS FOR SPRAYING LIQUID PRODUCT

Frederick F. Oligschlaeger, Rockford, Ill., assignor to Dickey-John Corporation, Auburn, Ill.

Filed May 28, 1974, Ser. No. 473,395
Int. Cl. B05b *9/06*
U.S. Cl. 239—155 **18 Claims**

1. In a liquid distributor apparatus for use in a vehicle to distribute liquid product along a path traversed by the vehicle at a time rate of flow generally proportional to vehicle speed to maintain a preset spread density, the distributor apparatus including a tank for carrying a quantity of liquid product, product pump means having an inlet connected to receive

product from the tank and an outlet connected to a delivery conduit means for delivering liquid product under pressure thereto, spray bar means connected to receive liquid product from the delivery conduit means and having nozzle means operative over a range of pressures to spray liquid product generally uniformly across a preselected width of spread at a time rate of flow that varies generally as a function of the square root of the pressure drop across the nozzle means, pressure sensing means for sensing the pressure on the liquid product in said spray bar means, pressure signal means responsive to said pressure sensing means and operative over a range of pressures for producing a first electrical control signal correlative with the pressure on the liquid product in said spray bar means, vehicle speed sensing means for producing a second electrical control signal correlative with the speed of the vehicle, and control means responsive to said first and second electrical control signals for controlling the rate of flow of liquid product to said spray bar means to vary the pressure on the product in said spray bar means generally as a function of the square of the speed of the vehicle and thereby maintain a preset spread density.

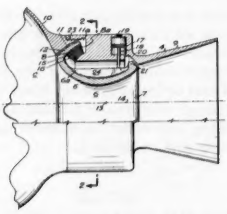


3,877,646

COMPACT THRUST NOZZLE FOR ROCKETS

Edward E. McCullough; Robert W. Bambrick, both of Brigham City, and Richard C. Laramee, Ogden, all of Utah, assignors to Thiokol Chemical Corporation, Bristol, Pa.

Filed Jan. 7, 1974, Ser. No. 431,468
Int. Cl. B64c *15/00*
U.S. Cl. 239—265.19 **4 Claims**



1. A thrust nozzle for rockets comprising:

an annular, convergent-divergent nozzle member having an annular recess at the juncture of convergence and divergence thereof;

a thin-walled annular throat member forming a venturi orifice seated in the recess with space for movement of the throat member therein, a small space also being provided between the downstream end of the throat member and the nozzle member so that the space surrounding the throat member is open to the propulsive gases of the rocket to promote thermal equilibrium in the throat member;

thin, external ribs on the throat member to support the thin structure thereof and also to function as heat radiating fins to cool the throat member;

annular flexible bearing means attaching and sealing the throat member at its forward end portion to the nozzle member so that propulsive gases from the rocket may not enter the space surrounding the throat member directly; and

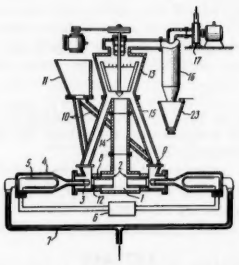
actuating means, having a driving arm, mounted to the nozzle member so that the driving arm may bear against the annular throat member for rotation thereof about an axis perpendicular to that of the rocket.

3,877,647

JET MILL

Vladimir Ivanovich Gorobets; Larisa Zhanovna Gorobets, both of ulitsa Sevastopolskaya, 26a, kv. 5; Anatoly Alexandrovich Ivanov, prospekt K. Marxa 13/15, kv. 29; Georgy Petrovich Tropin, ulitsa Bazhova 28, kv. 10, all of Dnepropetrovsk; Veniamin Ivanovich Chirkov, ulitsa Planetnaya 14, kv. 28, Moscow; Veniamin Viktorovich Konstantinov, ulitsa Fadeeva 59, kv. 70, Volgograd, and Viktor Deomidovich Belyaev, ulitsa Kaverina, 14, kv. 1, Dnepropetrovsk, all of U.S.S.R.

Filed May 30, 1973, Ser. No. 365,179
Int. Cl. B02c *19/06*
U.S. Cl. 241—39 **4 Claims**



1. A jet mill, wherein the material to be comminuted is ground through the collision of its particles accelerated by gas jets, comprising: a milling chamber; nozzles being disposed within said chamber and having outlets thereof directed toward the interior of said chamber; additional chambers communicating via pipes with a source of compressed gas and being connected directly to said nozzles; heater elements being disposed in said additional chambers; a classifier sizing the particles and communicating via pipes with said milling chamber; a precipitator being disposed downstream of said classifier and communicating therewith; an exhaust device being disposed downstream of said precipitator and venting exhaust gas from the mill; and a feed hopper communicating with said milling chamber at the points where said nozzles are disposed therein.

3,877,648

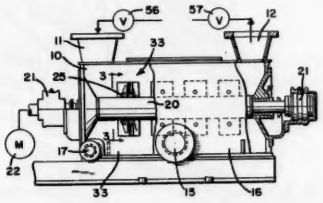
DEFIBERING APPARATUS INCLUDING MULTIPLE HORIZONTALLY SPACED COMMINUTING SURFACES

Robert F. Vokes, Franklin, Ohio, assignor to The Black Clawson Company, Middletown, Ohio

Filed Nov. 13, 1973, Ser. No. 415,298
Int. Cl. B02c *13/02*
U.S. Cl. 241—45 **10 Claims**

1. Defibering apparatus of the character described for the treatment of waste paper stock and the like, comprising:

a. an elongated enclosed tub,
b. means defining a port adjacent each end of said tub for respectively receiving and discharging stock under pressure,
c. a drive shaft extending generally centrally through said tub from one end thereof to the other,
d. a plurality of rotors mounted in axially spaced relation on said shaft,
e. means defining a front and back face on each of said rotors,
f. means forming an annular bed plate associated with each said rotor,



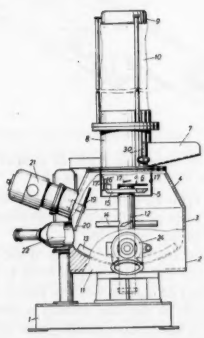
g. means supporting each said bed plate adjacent the back face of the associated said rotor and in predetermined closely spaced relation therewith,
h. said supporting means and each said bed plate being dimensioned to establish a passage for stock between at least one side edge thereof and the adjacent wall of said tub,
i. means defining a working surface on each said bed plate on the side thereof adjacent the associated said rotor, and
j. each said rotor including vane means constructed and arranged to create a vortical pattern in the stock on the front face thereof which includes a primarily centrifugal component inducing stock to travel between each of said rotors and its associated bed plate.

3,877,649

APPARATUS FOR CONVERTING THERMOPLASTIC MATERIAL

Friedrich Walter Herfeld, Muhlendorf 11, 5982 Neurenrade, Germany

Filed Nov. 23, 1973, Ser. No. 418,355
Claims priority, application Germany, Nov. 28, 1972, 2258197
Int. Cl. B02c *21/00*
U.S. Cl. 241—57 **7 Claims**



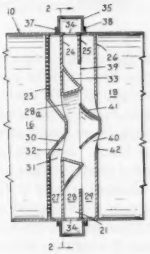
1. An apparatus for converting thermoplastic material in the form of lumps, pieces, plates, and sheets into free flowing granulated form comprising:
a substantially cylindrical mixing receptacle having a floor portion and a top portion;
a shaft pivotably disposed through the axis of the mixing receptacle having mixing blades for movement along the floor of said receptacle;
a substantially cylindrical comminuting chamber centrally disposed in the top portion of said mixing receptacle and receiving said shaft;
comminuting blades mounted on said shaft for movement within said comminuting chamber;
a charging input communicative with said comminuting chamber for receiving the thermoplastic material to be converted; and
a discharge outlet mounted adjacent to the floor of the mixing receptacle for discharging the material after mixing and granulation.

3,877,650

PARTITION FOR TUMBLING MILLS OR THE LIKE

Arthur Selwyn Cornford, Clarkson, Ontario, Canada, assignor to Aerofall Mills Limited, Ontario, Canada

Filed Feb. 19, 1974, Ser. No. 443,860
Int. Cl. B02c *17/06*
U.S. Cl. 241—71 **4 Claims**



1. In an apparatus comprising a horizontally mounted rotary drum along which a charge is caused to flow from an upstream zone of the drum to a downstream zone which is axially spaced from the upstream zone, means defining an intermediate zone at which an additional material may be introduced into the charge, said means comprising
a plurality of axially spaced transverse drum partitions defining first, second and third lifting chambers,
the first chamber including inlet means communicating with said upstream zone for admitting charge from the upstream zone to the first chamber, outlet means communication with a central region of the second chamber, and conical deflector means extending axially across the first chamber for substantially the entire axial length thereof, said conical deflector means cooperating with said outlet means for deflecting charge from the first chamber to a central region of the second chamber,
the second chamber including outlet means communicating with the third chamber, and annular deflector means extending axially across the second chamber for substantially the entire axial length thereof, said annular deflector means defining an annular region of the second chamber partitioned from the central region,
the second chamber further including peripheral inlet means communicating with said annular region for the admission of additional material thereto,
the annular deflector means providing a pair of inner and outer frusto-conical deflector surfaces cooperating with the outlet means of the second chamber for deflecting charge from said central region, and material from said annular region, into the third chamber,
the third chamber including outlet means communicating with said downstream zone and conical deflector means extending axially across the third chamber for substantially the entire axial length thereof, said conical deflector

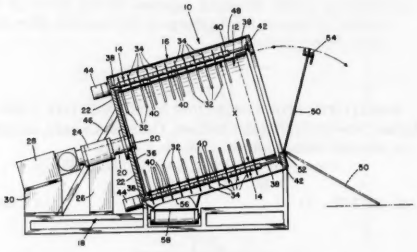
means cooperating with the outlet means of the third chamber for deflecting the charge and said additional material therethrough.

3,877,651

GRINDING APPARATUS

Clarence P. Harris, 328 Fountain Pl., Burlington, N.C. 27215

Filed Dec. 13, 1973, Ser. No. 414,717
Int. Cl. B02c *18/08, 18/14*
U.S. Cl. 241—85 **9 Claims**



1. A grinding apparatus comprising a support frame, a drum of unitary construction mounted for rotation upon said support frame, means for driving said drum, a plurality of cutter assemblies mounted in spaced, parallel relation around the outer periphery of said drum, each said cutter assembly including at least one blade, said rotatable drum having an irregular cross-sectional configuration and defining a plurality of spaced, aligned, blade-receiving slots in selected areas of the periphery, said drum slots sequentially receiving therein the blades of said cutter assemblies upon drum rotation to grind material within the drum, said drum cross-sectional configuration being irregular with slots provided therein such that the blades of selected cutter assemblies extend through said slots into said unitary drum while the blades of other cutter assemblies are positioned outwardly of said drum.

3,877,652

YOKE INDEXING MECHANISM FOR TOROIDAL COILINDING MACHINE

William Bernau, Short Hills, N.J., assignor to Universal Manufacturing Co., Inc., Irvington, N.J.

Filed Apr. 5, 1974, Ser. No. 458,210
Int. Cl. H01f *41/08;* **B65h** *81/02*
U.S. Cl. 242—4 C **7 Claims**

1. A toroidal coil winding machine for laying wire on a yoke, said machine having a base and mounted on said base a wire holding magazine, a shuttle ring, means to rotatably drive said wire holding magazine and said shuttle ring, a yoke holding and indexing means, and index drive means to drive said yoke holding and indexing means,

wherein said yoke holding and indexing means includes:

a first, a second and a third hollow post mounted on said base,

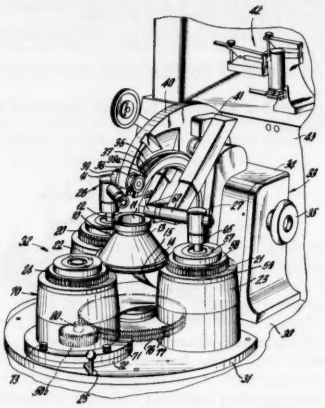
each of said posts having a first wheel rotatably mounted on the top thereof, each of said first wheels having a flange portion to support said yoke,

each of said posts having a second wheel rotatably mounted with respect thereto, connecting means within each post connecting said first wheel and said second wheel so that they rotate together,

a center gear wheel means rotatably mounted on said base and driven by said index drive means and in mesh with each of said second wheels;

said connecting means within said first and second posts being a hollow tubular member rotatably mounted within said respective post;

a shaft within each of said two hollow tubular members and protruding from the top of its hollow tubular member, spring means to spring-load said shaft against movement



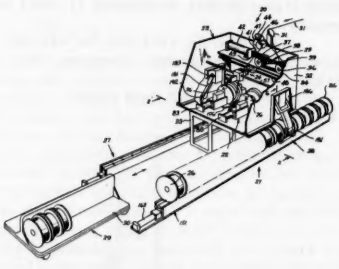
in the direction of its axis, and yoke holding means positioned near the outer ends of each shaft, said yoke holding means having a freely rotatable portion to hold down said yoke and permit its rotation.

3,877,653

HANDLING REELS IN HIGH-SPEED TAKEUP

Zdzislaw Stanislaw Foltyn, Snellville, and Daniel George Stetka, Dunwoody, both of Ga., assignors to Western Electric Company, Incorporated, New York, N.Y.

Continuation-in-part of Ser. No. 228,595, Feb. 23, 1972, abandoned. This application Feb. 6, 1974, Ser. No. 440,231
Int. Cl. B65h *67/04*
U.S. Cl. 242—25 A **19 Claims**



1. A method of handling reels in a dual position takeup apparatus, which includes the steps of:

moving empty reels along a path of travel to position successive leading ones of the reels in proximate alignment with one of the takeup positions;

moving each successive leading one of the empty reels from the path of travel of the empty reels to position the reel so that the axis of rotation of the reel is colinear with the axis of rotation of the one takeup position;

supporting each successive leading one of the empty reels for rotation in the one takeup position;

rotating the reel in the one takeup position; while

advancing and guiding elongated material transversely reciprocally across a winding surface of the reel in the one

takeup position to distribute the elongated material in successive layers on the reel;

discontinuing the rotation of the reel in the one takeup position when the reel is full of elongated material; and

removing each of the full reels from the one takeup position to an associated path of travel for full reels; and

regulating turning of the full reel to insure that each of the full reels to be advanced subsequently along the path of travel thereof has substantially all the elongated material wound thereon and substantially without loose tails of elongated material extending therefrom.

3,877,654

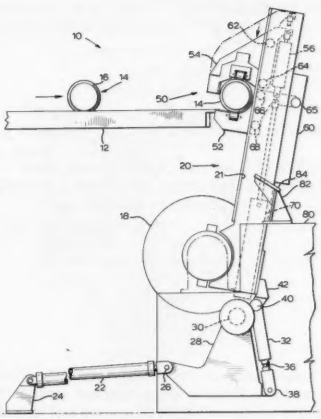
REEL BAR LOADING SYSTEM

Adu Randpalu, LaSalle, Quebec; Alfred Edel, Montreal, Quebec; Rodney Harold Bryce, Lachine, Quebec, and Bote Gosse Bruinsma, Hudson, Quebec, all of Canada, assignors to Dominion Engineering Works, Limited, Lachine, Quebec, Canada

Filed Oct. 1, 1973, Ser. No. 402,383

Int. Cl. B65h *17/08, 75/02*

U.S. Cl. 242—65 **10 Claims**



1. A reel machine for reeling continuous web material such as paper on a reel bar, having a pair of transfer arms at opposite ends of the machine mounted outboard of a reel drum in substantially coaxial relation therewith, clamp means mounted on said arms to secure a said reel bar for movement along said arms, radially relative to said drum, actuator means to pivot said arms to displace said reel bar into a reeling contact position with the drum, means to synchronize said arms for pivotal displacement, and means to receive the bar at a further position for continuous reeling, in combination with reel bar storage means for storing at least one reel bar adjacent the reel, said transfer arms presenting said clamp means adjacent the storage means to receive a said stored reel bar in clamped relation therein, for transfer along said arms towards said drum contact position, whereby rapid changing of a said reel bar with a minimum of handling is effected.

3,877,655

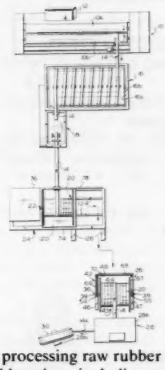
SYSTEM, METHOD AND APPARATUS FOR PROCESSING RAW RUBBER INTO STRIP STOCK FOR RETREADING TIRES

Felix G. Cardinal, 10255 S.W. Lancaster Rd., and Ralph V. Cardinal, 3535 S.W. Buddington, both of Portland, Oreg. 97219

Division of Ser. No. 244,514, April 17, 1972, abandoned. This application Feb. 7, 1974, Ser. No. 440,508

Int. Cl. B65h *17/02*

U.S. Cl. 242—67.1 R **2 Claims**



1. In a system for processing raw rubber into strip stock for use in retreading rubber tires, including a rubber mill and an extruder-retreading machine,

a strip-winding machine for winding rubber strip stock onto a spool for delivery to said extruder-retreading machine as the strip stock emerges in a continuous strip from said rubber mill, said strip-winding machine comprising:

a horizontally disposed rotatable spindle means for removably mounting a spool thereon, including spool-engaging means on said spindle means for drivingly engaging said spool,

spindle drive means for rotating said spindle means and thus said spool, said spindle drive means including torque-limiting means for limiting the torque transmitted to said spindle means and thereby controlling the tension in strip stock being wound on said spool,

level wind means driven from said spindle drive means for winding strip stock evenly on a spindle-mounted spool,

and spool ejector means for selectively ejecting a spool from said spindle means,

said spindle means including a spool-mounting portion and a spindle shaft portion, said spindle shaft portion being of approximately the same length as said spool-mounting portion, said spindle shaft portion being rotatably supported by bearing means adjacent its opposite ends, said spool-mounting portion being cantilevered from and forming an axial extension of said spindle shaft portion and terminating at an unsupported free end,

said spool ejector means including rail means extending parallel to and below said spool-mounting portion of said spindle means, said rail means extending along the length of said spool-mounting portion and longitudinally outwardly beyond said free end of said spool-mounting portion,

wheeled platform means mounted for movement along said rail means toward and away from said free end with a spool-supporting surface just slightly below the lowermost limits of a spool when mounted on said spool-mounting portion,

extensible pusher means including a vertically extending pusher plate connected to said platform means and fluid-operated cylinder means having an extensible ram portion connected to said pusher plate and an axis of extension lying generally parallel to the axis of rotation of said

spindle means, said extensible ram portion having a stroke at least as great as the length of said spool-mounting portion and being movable from a retracted position wherein said pusher plate is positioned rearwardly of a spool mounted on said spool-mounting portion and said platform means is positioned below said spool-mounting portion to an extended position to engage said pusher plate with said spool and push said spool from said spool-mounting portion and simultaneously move said platform means to a position outwardly of said spool-mounting portion to receive said spool as it drops from said spool-mounting portion.

3,877,656

REEL SUPPORTING DEVICE IN INSTRUMENTS LOADED WITH REELS

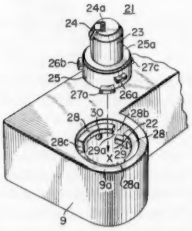
Kuniyoshi Suzaki, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 27, 1973, Ser. No. 336,365

Claims priority, application Japan, Mar. 3, 1972, 47-26399[U]; Mar. 3, 1972, 47-26400[U]; June 30, 1972, 47-77437[U]

Int. Cl. B65h *17/02*

U.S. Cl. 242—68.3 **8 Claims**



1. In a motion picture projector capable of being loaded with either a film cartridge having its own reel spindle therein or an open reel having a reel spindle receiving hole therein, a device for selectively accommodating said cartridge or supporting said open reel comprising:

reel spindle means having a cylindrical portion adapted to be inserted into the reel spindle receiving hole formed in said open reel, a mounting portion formed as an extension of said cylindrical portion and adapted to be mounted on said motion picture projector, and a plurality of retainer members projected outwardly at the circumference of the mounting portion,

said reel spindle means having a first mounting position on said motion picture projector wherein said mounting portion is mounted on the motion picture projector in such a manner that said cylindrical portion projects outwardly from the projector for supporting said open reel and a second mounting position on said motion picture projector wherein said mounting portion is mounted in the inverted direction with respect to the first mounting position so as to insert said cylindrical portion into said projector, for permitting the loading of said film cartridge; and

reel supporting means provided on said motion picture projector to removably mount said reel spindle means thereon, said supporting means having a mounting hole having a first portion for receiving said cylindrical portion of said reel spindle means, and a second portion, constituting an extension of said first portion, for mounting said mounting portion of said reel spindle means, a plurality of mating members being provided in the inner wall of said second portion of said mounting hole and being located to correspond to said retainer members of said reel spindle means,

said mating members being engageable with said retainer members in said respective first and second mounting positions,

whereby said reel supporting means is enabled to support said open reel when said reel spindle means is mounted in said hole in its first mounting position and is enabled to accommodate said film cartridge as loaded into said projector when said reel spindle is mounted in said hole in its second mounting position.

3,877,657

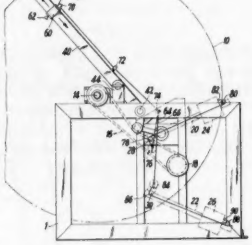
LEVERAGE WEIGHT CONTROL FOR TORQUE GENERATING MECHANISM

Donald Dane Zebley, deceased, late of Greenville, S.C. (by Mildred S. Zebley, executrix), assignor to United Merchants and Manufacturers, Inc., New York, N.Y.

Filed Mar. 20, 1974, Ser. No. 452,937

Int. Cl. B65h *25/04, 25/22*

U.S. Cl. 242—75.5 **12 Claims**

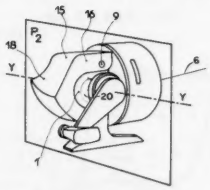


1. A torque control device for rotatively driving a roll adapted to have flexible sheet material wound thereabout comprising lever means having a free end and an end opposite said free end, said lever means being rotatively mounted at said opposite end about a pivot point for pivotal motion between a first angular position and a second angular position vertically displaced from said first position; a weight mounted on said lever means for positioning between said free end and said pivoted end; said lever means being arranged to be driven from said first to said second angular position by the gravitational force of said weight; means for driving said lever means from said second to said first angular position; means for transmitting to said roll torque developed by said lever means during motion thereof between said first and said second angular positions; means for sensing the diameter of said material roll; releasable brake means for holding said weight fixed upon said lever means; and means interconnecting said brake means and said diameter sensing means for effecting release of said brake means in response to said changes in the diameter of said material roll to permit relocation of said weight on said lever means; said brake being biased to become re-engaged after motion of said weight relative to said lever means through a distance commensurate with the change in diameter of said material roll.

3,877,658
FISHING REEL

Jean Paul Lemery, Cluses, France, assignor to Etablissements Carpano & Pons S.A., Cluses, France

Filed July 31, 1972, Ser. No. 276,537
Claims priority, application France, Aug. 4, 1971, 71.28623
Int. Cl. A01k *89/00*
U.S. Cl. 242—84.2 A **2 Claims**

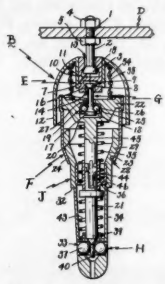


1. Fishing reel comprising spool means mountable on a rod for being normally held above the rod; a housing disposed on the spool means, having a pair of side walls which have at least generally parallel outer faces, with upper edges defining an opening of the housing; a line-release control push button and means for mounting the push-button on the housing for movement relative thereto; said push-button having an outer actuating surface and spaced apart side walls, said side walls including inner faces disposed at least substantially parallel to one another, closely engaging over and disposed outside said outer faces to substantially close said opening, during the entire movement of said push button, against any entrance of foreign bodies and of liquid into the housing.

3,877,659
BOBBIN HANGER

Toshiyasu Takata, Onomichi, Japan, assignor to NTN Toyo Bearing Company Ltd. and Zenzaburo Tsukumo, both of Osaka, Japan

Filed June 26, 1973, Ser. No. 373,877
Claims priority, application Japan, June 29, 1972, 47-65642
Int. Cl. B65h *49/02*; **D03j** *5/08*
U.S. Cl. 242—130.2 **7 Claims**

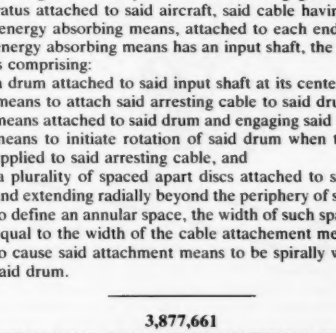


1. A bobbin hanger for mounting on a hanger rail comprising an upper member having opposed ends and means at one end for fixedly mounting same to a hanger rail for universal movement relative thereto, an intermediate member having means for operatively mounting same at one end to the other end of said upper member for universal movement relative thereto and a lower member having means for operatively connecting same at one end to the other end of said intermediate member for vertical movement relative thereto, said lower member including laterally movable locking means at the lower end thereof for engagement with the internal shoulder portion of a bobbin and vertically reciprocable actuating means for actuating said locking means to project or retract same laterally for engagement or disengagement with the shoulder portion of the bobbin.

3,877,660
DEVICE FOR BRAKING MOBILE OBJECTS

Jean-Paul G. Bernard, Paris, France, assignor to Aerazur Constructions Aeronautiques (Societe Anonyme), Mouli-neaux, France

Filed June 25, 1973, Ser. No. 373,337
Claims priority, application France, June 26, 1972, 72.23037
Int. Cl. B65h *59/04*; **B64f** *1/00*
U.S. Cl. 242—156 **4 Claims**



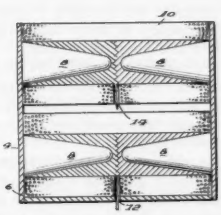
1. In apparatus for braking an aircraft of the type wherein an arresting cable is disposed so as to be engaged by a hook apparatus attached to said aircraft, said cable having rotary, fluid energy absorbing means, attached to each end wherein said energy absorbing means has an input shaft, the improvements comprising:

a. a drum attached to said input shaft at its center,
b. means to attach said arresting cable to said drum,
c. means attached to said drum and engaging said attaching means to initiate rotation of said drum when tension is applied to said arresting cable, and
d. a plurality of spaced apart discs attached to said drum and extending radially beyond the periphery of said drum to define an annular space, the width of such space being equal to the width of the cable attachement means so as to cause said attachment means to be spirally wound on said drum.

3,877,661
WITHDRAWAL OF FLEXIBLE MATERIAL FROM A PACKAGE WITH TWISTLESS PAYOUT

James W. Newman, Scarsdale, N.Y., assignor to Windings, Inc., Yonkers, N.Y.

Continuation-in-part of Ser. No. 113,319, Feb. 18, 1971, Pat. No. 3,698,005, which is a continuation-in-part of Ser. No. 819,777, April 28, 1969, abandoned, which is a continuation-in-part of Ser. No. 810,990, March 27, 1969, abandoned. This application Aug. 24, 1972, Ser. No. 283,486The portion of the term of this patent subsequent to Sept. 5, 1989, has been disclaimed.
Int. Cl. B65h *55/00*
U.S. Cl. 242—163 **4 Claims**



1. A stand for mounting a universal wind package of flexible material having an unobstructed axial opening and a radial opening extending from the periphery of the package to the axial opening through which the inner end of the material is

drawn out comprising opposed tapering members terminating at a short distance from each other, said tapering members supporting the package of flexible material the stand having walls supporting said tapering members and the distance from each wall to the apex of the tapering member carried thereby being at least substantially as great as the distance from each wall to the mid-plane of the stand.

3,877,662

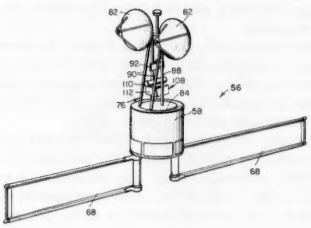
ISOLATED FRAME ON PLATFORMS STABILIZED BY SPINNING BODY

Gordon S. Reiter, 13900 Panay Way, Apt. S-321, Marina del Rey, Calif. 90291; Charles P. Rubin, 3139 Coolidge Ave., Los Angeles, Calif. 90066; Ronald V. Swanson, 2023 Redondela Dr., San Pedro, Calif. 90732; Bernard F. Burns, Jr., 906 11th St., Manhattan Beach, Calif. 90266, and Anthony J. Iorillo, 551 Paseo Miramar, Pacific Palisades, Calif.

Continuation of Ser. No. 151,327, June 9, 1971, abandoned. This application May 11, 1973, Ser. No. 359,290

Int. Cl. B64g *1/10*

U.S. Cl. 244—1 SA **2 Claims**



1. An instrument-carrying vehicle comprising:

a gyroscopic mass rotatable on a first axis;

a despun platform rotatably mounted on said gyroscopic mass to rotate with respect thereto on a second axis and rotatable at a slower speed in selected coordinates than said gyroscopic mass, the difference between said first and second axes causing wobble at the frequency of their relative rotation;

a nutation damper mounted upon said platform to rotate on an axis substantially normal to said first axis and tuned to a frequency closer to the nutation frequency than any other system frequency to damp nutational movements about the axis of said nutation damper;

an isolated frame pivotally mounted upon said despun platform on a third axis which is oriented substantially normal to said second axis of rotation, spring means interconnected between said frame and said platform for urging said frame rotationally about said third axis to a centered angular position with respect to said platform, said spring means being related to the mass of said frame so that said frame is tuned at a frequency closer to the spin frequency of said spinnable body than to any other system frequency and a directable instrument mounted on said frame so that wobble of said despun platform is isolated from said frame and said directable instrument by rotation of said isolated frame and said directable instrument mounted thereon on said third axis.

3,877,663

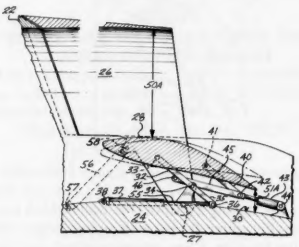
TRANSLATING SPLITTER VARIABLE AREA NOZZLE AND REVERSER

Robert W. Curran; William F. Dahlin, both of Seattle, and Gabriel E. Stearns, Mercer Island, all of Wash., assignors to Aeritalia S.p.A., Naples, Italy

Filed Nov. 19, 1973, Ser. No. 417,448

Int. Cl. B64d *33/04*

U.S. Cl. 244—110 B **19 Claims**



1. Apparatus for varying the exhaust nozzle area of a jet engine fluid flow duct, comprising: an airfoil panel positioned in the engine thrust flow and having its spanwise axis transverse to the fluid flow duct; means for longitudinally positioning the airfoil panel relative to the exhaust exit plane of the duct so as to split the fluid flow duct into two exhaust nozzles and exit flow areas; and means for changing the angle of incidence of the airfoil panel to vary the exit flow area of each of the exhaust nozzles.

3,877,664

MOORING DEVICE

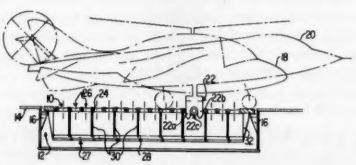
Gerard Mesnet, London, England; Georges Dadon, Kremlin Biceire, France; Raymond Le Guennec, Lorient, France; Philippe Remon-Beauvais, Ris Organgis, France; Yann Pivet, and Armand Le Luherne, both of Lorient, France, assignors to Etat Francais represente par le Delegue Ministresiel pour l'Armement, Paris, Armies, France

Filed Mar. 28, 1973, Ser. No. 345,744

Claims priority, application France, Apr. 19, 1972, 72.13713

Int. Cl. B64f *1/12*

U.S. Cl. 244—115 **7 Claims**



1. A mooring device for engaging and holding a mooring hook or clamp secured to a load to be moored on an unstable platform, such as helicopter upon landing on the deck of a ship, said mooring device comprising an upper perforated plate including a plurality of holes for engaging a said mooring hook and lower support means for supporting the platform so as to increase the loading strength thereof, said holes being flared at the top and the bottom as viewed in cross section and said support means including a base framework and a plurality of upright support columns which extend upwardly from said base framework to support said plate.

3,877,665
FUSELAGE CONFIGURATION

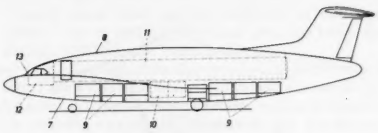
Rolf Riccius, Worpswede, and Herbert Sadowski, Bremen, both of Germany, assignors to Vereinigte Flugtechnische Werke-Fokker GmbH, Bremen, Germany

Continuation of Ser. No. 70,671, Sept. 9, 1970, abandoned. This application Mar. 16, 1973, Ser. No. 341,945

Claims priority, application Germany, Sept. 9, 1969, 1945518

Int. Cl. B64c *1/00*

U.S. Cl. 244—130 **3 Claims**



1. A fuselage for high subsonic speed aircraft, comprising two elongated fuselage portions which are arranged one above the other in longitudinal direction, said upper portion having a surface of an approximately circular cross section and said lower portion having a surface of a cross section which is approximately that of an ellipse having a horizontally oriented major axis, said fuselage portions being arranged such that the circular surface of said upper portion and the elliptical surface of said lower portion mutually intersect each other throughout a substantial part of the length of the fuselage, the maximum dimension of said major axis of said lower portion, in the region of the forward section of the fuselage, being greater than the maximum diameter of said upper portion in said forward section, the total cross-sectional area of both portions increasing continuously in longitudinal direction from the forward end of the fuselage until it reaches a maximum and thereafter decreases continuously in longitudinal direction toward the aft end of the fuselage.

3,877,666
METHOD FOR THE CONTINUOUS DETECTION OF VEHICLE POSITION

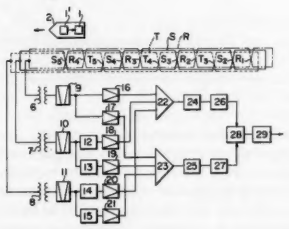
Eiji Itakura, Koganei; Toshiaki Sasaki, Tokyo, both of Japan, assignors to Japanese National Railways, Tokyo, Japan

Filed Feb. 7, 1974, Ser. No. 440,479

Claims priority, application Japan, Feb. 7, 1973, 48-14615

Int. Cl. B61l *25/00*

U.S. Cl. 246—122 R **4 Claims**



1. A method of continuously detecting the position of a vehicle wherein the vehicle includes means for transmitting a magnetic field of a predetermining frequency and amplitude; and the vehicle travels parallel to a plurality of induction lines, wherein the number of induction lines equals n, each induction line having a plurality of nodal points of transposition, the inter-nodal distance being the same between all the nodal points on all of the induction lines, wherein the nodal points in each induction line are staggered with respect to the nodal points on adjacent induction lines by a distance of $(n-1)/n$ (the distance between nodes), said method comprising the steps of transmitting a signal from the vehicle to the induction lines and thereby inducing a sine wave voltage in each of the induction lines; successively phase shifting said induced signal in each of the induction lines except one by an amount equal to $180° (n-1)/n$ in both the positive and negative direction; adding all of said positively shifted signals and said non-shifted signal; adding all of said negatively shifted signals and said non-shifted signals; comparing the phase difference of said added signals, the phase difference being indicative of the position of the vehicle.

3,877,667
MOUNTING OF OUTBOARD MOTORS

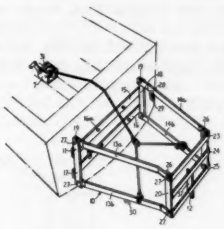
Walter John Bruce Monckton, 1 Cromwell St., Cooma, New South Wales, Australia

Filed Mar. 21, 1973, Ser. No. 343,246

Claims priority, application Australia, Mar. 22, 1972, 8367/72

Int. Cl. B63h *21/36*

U.S. Cl. 248—4 **5 Claims**



1. An adjustable mounting bracket for an outboard motor comprising a first mounting means for securing to the transom or other suitable part of a boat, a second mounting means to which an outboard motor may be attached in a substantially vertical position, said first and second mounting means being respectively situated in first and second parallel planes, two pairs of parallel arms constituting a pair of spaced apart parallel linkages connecting said first and second mounting means to allow the second mounting means to be raised or lowered relative to the first mounting means while maintaining said second plane parallel to said first plane, and means for maintaining the bracket in any desired relative position, characterised in that the two pairs of parallel arms are respectively situated at their portions which extend between said first and second mounting means in planes which converge towards one another as they approach the second mounting means, said second mounting means having between said pairs of parallel arms a width smaller than the width of said first mounting means between said pairs of parallel arms and all of said parallel arms having substantially equal lengths and maintaining said second plane parallel to said first plane in any relative position of the bracket, the space between said converging planes being completely free of any bracing or strengthening components extending between said arms so that the latter absorb all of the twisting forces or the like encountered by the bracket.

3,877,668
RETAINERS FOR FOOD CONTAINERS

Herman L. Von Sande, 19386 Kedzie Ave., Homewood, Ill. 60438

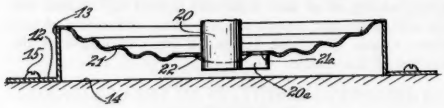
Filed June 7, 1973, Ser. No. 367,740

Int. Cl. A47g *23/02*

U.S. Cl. 248—154 **2 Claims**

1. Means for stabilizing a container on a supporting surface comprising a base, means for attaching the latter to said surface, a tubular wall rising from the base, a similar wall depend-

ing from the container to surround the base wall when the container is lowered for support on the same, and co-operative means within the walls effective to lock the container to the base on a partial lateral of the container, said co-operative means comprising a stud with a side lug depending from the container bottom, and a pair of opposed cams depending from the under surface of a flexible diaphram joining the upper edges of the tubular wall and engaging the side lug from underneath upon the lateral turning of the container in locking engagement.

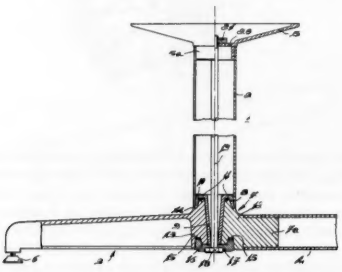


3,877,669

COMPOSABLE UNIT BASE FOR FURNITURE

Emilio Ambasz, 295 Central Park West, New York, N.Y. 10024

Filed June 6, 1973, Ser. No. 367,455
Claims priority, application Italy, Mar. 5, 1973, 41545/73
Int. Cl. A47b *11/00*
U.S. Cl. 248—188.7 **3 Claims**



1. Composable unit base for furniture, comprising a plurality of arms radially arranged with respect to a column and means for fixing the inner ends of said arms to the lower end of said column, said means including a projection provided at the inner end of each arm and extending upwardly from the upper side thereof, a groove formed at in the lower side of said arm end, an upper disc element fixed at the lower end of the column and engaged by said projection and a lower disc element engaging said groove, means for clamping said arm ends between said disc elements, wherein according to the improvement each inner arm end is laterally defined by two flat radial surfaces which converge towards the axis of the column and between which said projection and said groove extend concentrically to said axis, sleeve sector elements being further provided which are arranged between the inner ends of adjacent arms to fill the space therebetween and clamped between said disc elements.

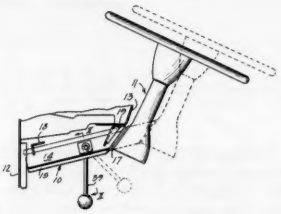
3,877,670

EXTENSIBLE SUPPORT STRUCTURE

Samuel A. Findley, and Francis C. Rieger, both of Bronson, Mich., assignors to The Scott & Fetzer Company, Bronson, Mich.

Filed Apr. 18, 1973, Ser. No. 352,447
Int. Cl. A45c *13/02*
U.S. Cl. 248—298 **11 Claims**

1. An extensible support structure for supporting a device in adjustable positions relative to a structural member, said support structure comprising an elongated housing having means for attaching the housing to the structural member, said housing having at least one inner surface defining an elongated passageway having a wall with at least one discontinuity extending the length of the passageway so that the cross section of the passageway can be contracted and expanded, a first elongated member telescopically received in the elongated passageway and being free to assume an infinite number of axial positions in the elongated passageway with respect to the housing, said first member having one end extending from the passageway and adapted for attachment to the device, and



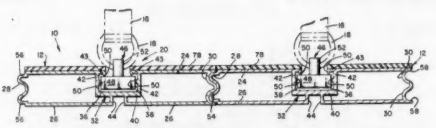
means for contracting and expanding the cross section of the passageway so that portions of the wall forming the passageway clampingly engage the first member to frictionally lock said first member in one of the axial positions, said means for contracting and expanding comprising a cam disposed on a rotatable shaft, said shaft engaging one side of the discontinuity and the cam engaging the other side so that rotation of the cam in one direction positively contracts the cross section of the passageway and rotation of the cam in the opposite direction positively expands the cross section of the passageway to enable axial positioning of the first member therein.

3,877,671

UNITARY TIE-DOWN PANEL APPARATUS

Paul Underwood, Garden Grove, and Edwin F. Barranger, Huntington, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Continuation of Ser. No. 232,136, March 6, 1972, abandoned.
This application Jan. 16, 1974, Ser. No. 435,152
Int. Cl. B61d *45/00*
U.S. Cl. 248—346 **4 Claims**



1. A tie-down panel apparatus comprising:

a plurality of panel elements, each said panel element comprising a unitary, extruded structure including an upper plate having lengthwise opening means therein, a lower plate positioned substantially parallel to said upper plate, side portions at opposed sides of said upper and lower plates integrally secured thereto, and a tie-down section secured to said upper and lower plates positioned between said side portions and at said upper plate opening means, said side portions and said tie-down section being the sole means for integrating said upper and lower plates into a substantially rigid structure;

said side portions having a Σ-shaped configuration to enable interlocking of said plurality of said panel elements, one with the other, to extend the width of said panel elements to a desired width;

each of said panel elements capable of being cut along the length thereof perpendicular to the sides of said elements

to enable tailoring of said panel elements to a desired length;

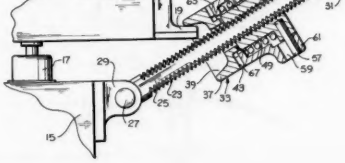
said tie-down section of each of said panel elements comprising a U-shaped channel extending through the length of each of said panel elements and including a bottom wall parallelly positioned with respect to said upper and lower plates, a pair of side walls extending between said bottom wall and said upper and lower plates, said side walls having integral connections to said bottom wall and said upper plate, said upper plate having a pair of portions defining said upper plate opening means and overlapping said U-shaped channel, said connections of said side walls to said upper plate spaced adjacent to said opening means, and a pair of segments secured between said bottom wall and said lower plate; and

a tie-down mechanism having means disposed between said upper plate opening means and in said U-shaped channel between said upper plate portions and said bottom wall for securing equipment, containers, and the like to said panel elements.

3,877,672
FASTENER

Thomas B. Wright, Diamond Bar, Calif., assignor to TRW Inc., City of Industry, Calif.

Filed June 21, 1972, Ser. No. 264,729
Int. Cl. B65d *45/24*
U.S. Cl. 248—503 **2 Claims**



1. A fastener comprising:

a screw;

a fastener member mounted on said screw for movement longitudinally thereof, said fastener member having a first collar projecting axially of the screw and defining a cavity opening in the axial direction;

means for substantially preventing relative rotation between the screw and the fastener member;

a nut mounted on said screw for threaded cooperation therewith whereby rotation of the nut in one direction advances the nut along said screw toward the fastener member and rotation of the nut in the opposite direction withdraws the nut away from the fastener member;

a locking member having a passage therethrough and forming a housing for said nut, said nut being in said passage; a pin mounted on said nut and projecting radially outwardly thereof;

said locking member having a slot extending completely therethrough for receiving said pin, said slot being of larger axial dimension than said pin to thereby allow for relative axial movement between said locking member and said nut;

biasing means radially intermediate portions of the nut and the locking member for urging the locking member generally axially toward said fastener member;

radially extending cooperating teeth on said members, each of said teeth including a cam surface for permitting rotation of said nut and said locking member in said one direction when said cooperating teeth are engaged whereby rotation of said nut and said locking member advances said fastener member along said screw, each of said teeth including a locking surface for preventing substantial rotation of said nut and said locking member in said opposite direction when said cooperating teeth are engaged whereby a positive lock is provided and said nut and said locking member are locked against substantial movement away from the fastener member, said locking member and said nut being rotatable in said opposite direction by first moving the locking member generally axially of the screw against the force of the biasing means to disengage said cooperating teeth;

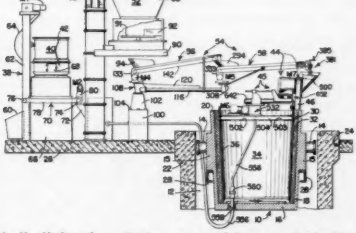
said fastener member including a second collar projecting axially toward said nut radially inwardly of said teeth to reduce the tendency of the fastener member to wobble on said screw, said first and second collars extending in opposite directions; and

said locking member including a radial outward projection having said slot extending therethrough, said locking member including a flange extending radially inwardly, one end of said biasing means bearing against said flange.

3,877,673
COLLAPSIBLE PATTERN FOR A LADLE-LINING INSTALLATION

Angelo J. Bisinella, Niles, and Roy F. Nosek, Berwyn, both of Ill., assignors to Pettibone Corporation, Chicago, Ill.

Division of Ser. No. 168,689, Aug. 3, 1971, Pat. No. 3,779,679.
This application Dec. 4, 1972, Ser. No. 311,884
Int. Cl. B28b *7/30*
U.S. Cl. 249—83 **7 Claims**



2. A ladle-lining installation comprising a relatively deep ladle having a generally circular bottom wall and an upstanding, upwardly and outwardly sloping side wall terminating in an elliptical upper rim, and an expensible and contractible shell-like, generally frusto-conical, separable, two section pattern positioned with its small end region facing downwards, centered within said ladle, and embodying an outer composite shell which, when fully expanded, is conformable in shape to that of the ladle side wall and, in combination with such side wall, defines an annulus which is adapted to be rammed with refractory lining material and which, when so rammed, produces a lining for said ladle side wall, said pattern being comprised of an upper pattern section and a similar lower pattern section, each pattern section being comprised of two generally semi frusto-conical wall parts hingedly connected together in clamshell fashion along a substantially vertical hinge line, and, in addition, a relatively narrow gate flap of substantially the same height as the wall parts, interposed between the dital side edges of said wall parts, having one of its side edge regions hingedly connected to the digital side edge of one of said wall parts and having its other side edge region disposed in coextensive sealing engagement with the distal side edge of the other wall part in order to close the gap between the distal edges of the two wall parts when the pattern section is in its expanded position, a spreader jack assembly extending internally acros each pattern section in secant fashion and connected at its ends to the wall parts respectively, a divided base

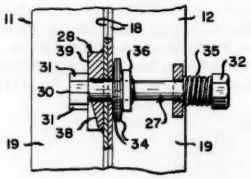
plate extending across the lower small end region of said upper pattern section, a divided deck plate extending across the upper large end region of said lower pattern section, means for releasably securing said base plate to the deck plate, and at least three circumferentially spaced levelling jacks fixedly mounted on the lowr rim region of the outer composite shell of the pattern and designed for engagement with the bottom of the ladle, the hinge line for the two pattern parts being vertically aligned.

3,877,674

SPRING LOCK MEANS FOR CONNECTING ABUTTING FORM PANELS

Henry P. Cerutti, Mount Lebanon Township, Allegheny County, Pa., assignor to Blaw-Knox Equipment Inc., Pittsburgh, Pa.

Filed Feb. 16, 1973, Ser. No. 333,329
Int. Cl. E04g *9/04*
U.S. Cl. 249—196 **6 Claims**



1. In a modular concrete form panel unit comprising a facing panel, a peripheral frame attached thereto of members having planar edges normal to the panel positioned to abut the corresponding edges of adjoining units, elongated openings positioned in those edges to register with like openings in adjoining unit edges, circular cam elements disposed around certain of those openings on the inside face of the edge, and T-head fasteners adapted to extend through those registering openings and upon rotation engage the cam elements, the improvement comprising a washer on the T-head fastener shaft spaced from the T-head, a first compression spring positioned between the washer and a frame member edge, the spring being compressed when the T-head engages a cam element and having a travel when uncompressed less than that required to maintain the T-head fastener within the frame, a bearing member affixed to the frame member edge but spaced therefrom and having a hole through which the shaft of the T-head fastener extends, an operating head on the outer end of that shaft, and a second compression spring positioned between the bearing member and the operating head having a travel when uncompressed sufficient to maintain the T-head fastener within the frame.

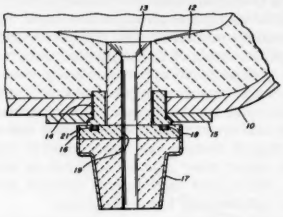
3,877,675

SEAL CONSTRUCTION AND METHOD OF FORMING SEAL BETWEEN TWO ABUTTING SURFACES

James T. Shapland, 113 Penhurst Dr., Pittsburgh, Pa. 15235

Filed Feb. 13, 1974, Ser. No. 442,294
Int. Cl. C21b *7/14*
U.S. Cl. 251—144 **5 Claims**

1. The combination, with two members which have abutting surfaces and are adapted to be heated to a relatively high temperature, at least one of said members having an annular groove in its surface, of an improved seal construction comprising an annular mortar-filled tube within said groove, the mortar of which is capable of setting at the temperature to which said members are heated, the material of said tube excluding air from the mortar therein, but being capable of



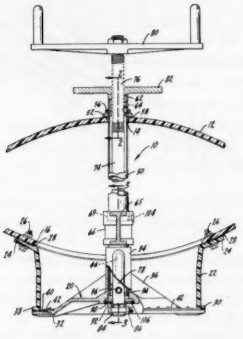
charring or burning away at said temperature after the mortar sets.

3,877,676

FLOW CONTROL VALVE

James F. Forchini, Healdsburg, and John L. Sylvester, Santa Rosa, both of Calif., assignors to Ecodyne Corporation, Lincolnshire, Ill.

Filed Apr. 1, 1974, Ser. No. 457,017
Int. Cl. F16k *31/50, 1/50*
U.S. Cl. 251—145 **10 Claims**



1. A flow control valve assembly for use in controlling liquid flow through a large diameter pipe, comprising:

a. a valve body member secured to the outside of said pipe around a discharge opening through a bottom section of said pipe;

b. a valve disc assembly means for selectively closing off liquid flow through said valve body member;

c. said disc assembly means including a disc portion having a seal associated therewith movable between a first position in sealing relationship to said body member and a second position spaced from said body member, and a centrally disposed hollow hub portion extending upwardly into said valve body;

d. a support tube means extending diametrically through said pipe and having an upper end portion secured to a top portion of said pipe and a bottom end portion slideably received within said hub portion of said disc assembly means;

e. a threaded valve stem means extending through said support tube means;

f. said valve stem means having an upper end threadedly received through an insert secured to said upper end portion of said support tube means and a lower end extending through said hub portion of said disc assembly means;

g. translating means associated with said lower end of said stem means for contacting a bottom surface of said disc assembly means and thereby translating vertical movement of said valve stem means to said disc assembly means;

h. pin means extending through said support tube means and received within vertical slots formed within said hub portion of said disc assembly means so as to prevent rotation of said disc assembly means about said support tube means; and

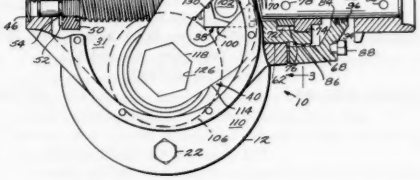
i. handle means secured to said stem means for rotation of said stem means about a substantially vertical axis.

3,877,677

VALVE OPERATOR FOR BUTTERFLY VALVES OR THE LIKE

Joseph L. Daghe, and Richard A. Stultz, both of Decatur, Ill., assignors to Mueller Co., Decatur, Ill.

Filed Mar. 6, 1974, Ser. No. 448,715
Int. Cl. F16h *27/02*
U.S. Cl. 251—228 **24 Claims**



1. A valve operator for controlling the movement of and adjustably controlling the limits of such movement of a valve member carried by a rotatable valve shaft of a valve, said valve operator comprising:

a housing member associated with the valve and defining an enclosed chamber;

an operating shaft having one end portion extending through said housing and having threads on a second portion of the same within the housing;

means for supporting said operating shaft in an adjusted axial position and for rotatable movement, said means including an adjustable collar threadedly received in said housing and having an exterior non-circular configuration on a portion extending exteriorly of said housing, a stem bushing fixed to said operating shaft and a stem retainer nut carried by said adjustment collar and retaining said stem bushing axially fixed with respect to the adjustment collar;

an operating nut carried on the threaded portion of said operating shaft and movable axially on said operating shaft when said operating shaft is rotated;

stop means on said adjustment collar for engaging said operating nut and limiting its movement in one direction and a second stop means carried by said operating shaft for engaging said operating nut and limiting movement in an opposite direction;

means coupling the operating nut to the valve shaft for rotating the valve shaft;

and an adjustment cap having a non-circular interior configuration complementary to the non-circular exterior configuration of said adjustment collar and covering the same with an end portion of said operating shaft extending through the cap, said adjustment cap being bolted to said housing and having a slight lost motion play with said adjustment collar whereby said adjustment cap can be unbolted from said housing and rotated in one direction or the other to cause rotation of said adjustment collar to simultaneously adjust said first and second stop means and then rotated in reverse direction for rebolting without affecting the adjustment.

13. A valve operator for controlling the movement of a valve member carried by a rotatable valve shaft of a valve, said valve operator comprising:

a housing member for attachment to the valve, the housing member defining an enclosed chamber;

a rotatable operating shaft supported by said housing member against axial movement, said operating shaft having threaded portion within said enclosed chamber and another portion extending exteriorly of the housing member for receiving means to rotate the same;

a follower nut threadedly carried on the threaded portion of said operating shaft for movement axially of the operating shaft;

a bellcrank member having one end pivotly mounted on an axis spaced from and transverse of an axis of the operating shaft, and having its other end operatively connected to said follower nut for movement therewith;

means operatively connecting the said one end of said bellcrank member to the rotatable valve shaft, said lastmentioned means including a tubular boss extending from said housing member and having an end for coupling with the valve, said tubular boss having an axis concentric with the pivot axis of said bellcrank member, a tubular coupler member rotatably carried in said boss and having a bore therethrough with one end portion adapted to fit over and be fixed to the valve shaft and the other end portion of non-circular configuration, said bellcrank member having a bore therethrough surrounding its pivot axis and of non-circular configuration complementary to the non-circular configuration of the other end portion of saic coupler member, and a shaft fixedly connected to said bellcrank member and having a portion of non-circular cross-section complementary tothe to the configuration of said bore in said bellcrank member and said coupler member, respectively, said shaft slideably extending through the non-circular bore in said bellcrank member into the non-circular bore of said coupler member whereby said valve shaft is rotated when said bellcrank member is pivoted by said follower member and whereby said coupler member may be interchanged with other coupler members for use with valves having particular size valve shafts.

3,877,678

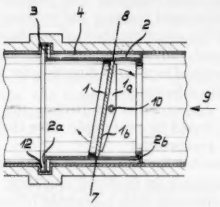
DEVICE FOR CLOSING A ROUND HOT AIR OR EXHAUST DUCT

Richard Jung, Gummersbach, Germany, assignor to L & C Steinmuller GmbH, Gummersbach, Germany

Filed Feb. 11, 1974, Ser. No. 441,656
Claims priority, application Germany, July 7, 1973, 2334683
Int. Cl. F16k *1/22*
U.S. Cl. 251—305 **3 Claims**

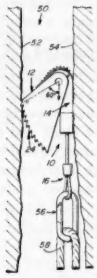
1. A device for closing a round hot air or exhaust gas duct, comprising a symmetrically mounted pivoted flap having a pivot web portion and a substantially cylindrical flap wing with a peripheral closing edge, a flexible cylindrical insert of thin material arranged in the duct in the range of and extending around said flap, said insert having at least one of its two ends sealed with said duct, the inside diameter of said insert being

slightly smaller than the outside diameter of said flap wing, and a closed annular circumferentially and axially extending



rib attached at least on the downstream side of said flap wing adjacent to said closing edge.

3,877,679
ANCHOR DEVICE FOR MOUNTAIN CLIMBERS
Greg E. Lowe, Ogden, Utah, assignor to Lowe Alpine Systems, Inc., Louisville, Colo.
Filed Aug. 16, 1973, Ser. No. 388,921
Int. Cl. B66d *1/58*
U.S. Cl. 254—135 **8 Claims**



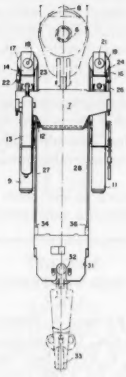
3. An artificial chockstone, comprising, in combination:

a. a main body having an opposed pair of tapered walls converging toward one another in a common direction to form an apex, the walls forming a wedge, and a cam surface extending between the tapered walls; and

b. an orientation assembly pivotably mounted on the main body adjacent the apex of the tapered walls, the wedge being selectively arrangeable wedged between constricting surfaces, and the main body and orientation assembly cooperating for orientating the main body between a pair of spaced surfaces by action of the orientation assembly camming the main body between the spaced surfaces.

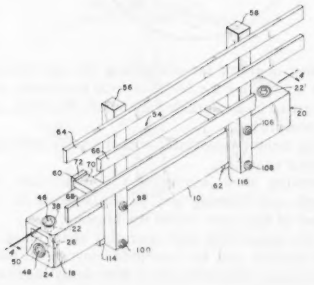
3,877,680
CYLINDER SYNCHRONIZER FOR DRILLING EQUIPMENT
Willard D. Childs, P.O. Box 582, Olivenhain, Calif. 92024, and A. Bruce Duncan, 540 Boulevard, Piedmont, Calif. 94610
Filed Oct. 1, 1973, Ser. No. 402,145
Int. Cl. F01b *1/00*
U.S. Cl. 254—189 R **2 Claims**

1. A cylinder synchronizer for drilling equipment comprising a main frame, means for pendulously suspending said main frame, a hook frame, a pair of fluid motor cylinders mounted on said main frame with means for equalizing fluid pressures therein, a pair of plungers each reciprocably mounted in a respective one of said cylinders and extending upwardly therefrom, a pair of pulleys each rotatably mounted at the upper end of a respective one of said plungers, a pair of flexible straps each secured at one end to said main frame then passing over a respective one of said pulleys and at the other end disposed adjacent said hook frame, a pair of pivot pins each connecting said other ends of said straps to said hook frame at selected laterally spaced points on opposite sides of said



hook frame for supporting a hook at a support point substantially midway between said selected points and at an elevation lower than that of said selected points.

3,877,681
ROADWAY BARRIER
Donald F. Humphrey, 2601 Mason St., Wheaton, Md. 20902
Filed May 29, 1973, Ser. No. 364,431
Int. Cl. E01f *3/00*
U.S. Cl. 256—64 **16 Claims**



1. A portable barrier for use on roadways or the like comprising:

a. an elongated, substantially rigid base of light weight material,

b. said base being hollow to provide a liquid reservoir therein,

c. said base having a flat bottom surface and a front surface extending substantially the length thereof,

d. said base including opening means for permitting said reservoir to be filled and drained while said base is supported in a horizontal position,

e. cap means cooperating with said opening means for sealing said reservoir,

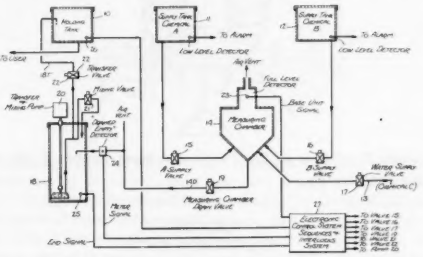
f. a barricade superstructure, and

g. means for detachably clamping said superstructure to said base such that a portion of said superstructure rigidly abuts said front surface and said superstructure extends generally upwardly relative to said base.

3,877,682
AUTOMATIC CHEMICAL MEASURING AND MIXING MACHINE

Lester I. Moss, Hackensack, N.J., assignor to Mosstype Corporation, Waldwick, N.J.

Filed Mar. 8, 1974, Ser. No. 448,921
Int. Cl. B01f *7/22, 15/04*
U.S. Cl. 259—7 **9 Claims**



1. In a machine for measuring and mixing two or more chemical components having a desired volumetric ratio to produce a limited quantity of a solution,

A. a measuring chamber having a capacity whose volume is equal to a unit volume in the desired volumetric ratio;

B. a mixing tank coupled to the measuring chamber to receive the contents thereof;

C. supply valve means interposed between separate sources of said components and said measuring chamber;

D. drain valve means interposed between said measuring chamber and said mixing tank; and

E. a control system responsive to signals indicative of the level of the contents in said measuring chamber to operate said supply and drain valve means in a sequence in which the components from said sources are each fed into said measuring chamber until the chamber is completely filled, after which the entire contents of the chamber is discharged into said mixing tank, said system being programmed to provide said desired component ratio in said mixing tank.

3,877,683
BATCH TINTING APPARATUS

Norman L. Frank, San Jose, and Gail E. Onstott, Fremont, both of Calif., assignors to SCM Corporation, Cleveland, Ohio

Filed Mar. 22, 1974, Ser. No. 453,577
Int. Cl. B01f *7/06, 15/00*
U.S. Cl. 259—106 **7 Claims**

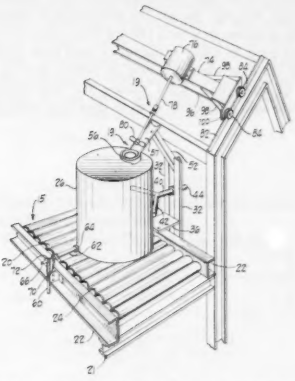
1. An apparatus for mixing liquid materials within a container having a bung opening, comprising:

conveying means for conveying said container to a mixing station;

a yoke member supported above the conveyor means within said mixing station;

a bung locater supported above said yoke member and adjacent to said conveyor means, said bung locater operative to grip the bung of the bung opening of said container and relocate the container into engagement with said yoke member for alignment with a mixing means;

a movable mixing assembly supported above said yoke member and adjacent to said conveyor assembly, said mixing assembly including an inclined depending shaft member and a mixing blade for entering the bung opening, said mixing assembly having means for rotating said shaft, and said movable mixing assembly operative to

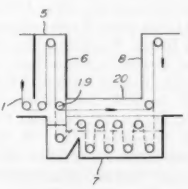


raise and lower said inclined shaft through said aligned bung opening.

3,877,684
CONTINUOUS ANNEALING FURNACE

Takao Kurihara; Nobuo Tanaka, both of Yokohama; Toru Yamagishi, Tokyo; Kazuhide Nakaoka, Yokohama; Kenzi Araki, Yokohama; Kozi Iwase, Yokohama, and Haruo Kubotera, Fukuyama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 10, 1974, Ser. No. 432,246
Claims priority, application Japan, Jan. 11, 1973, 48-5563
Int. Cl. C21d *9/48*
U.S. Cl. 266—3 R **3 Claims**



1. In a continuous annealing furnace for steel strip comprising a recrystallization heating zone, a rapid cooling zone, a carbon precipitation treating zone and a final cooling zone, improved facilities characterized in that said rapid cooling zone is divided into a gas-jet cooling zone and a water-quenching zone and an alternate path for said steel strip is provided parallel with said water-quenching zone such that the said strip may by-pass the said water quenching zone if necessary for a required rapid cooling rate.

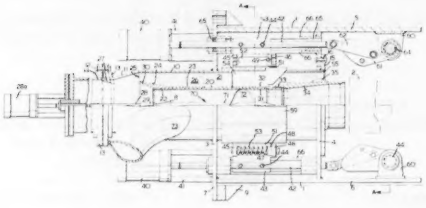
3,877,685
STEEL HARDENING APPARATUS

Louis E. Franceschina; Fred Haromy, both of Sault Ste. Mario, and Frederick William Kruppert, Goulais River, all of Ontario, Canada, assignors to The Algoma Steel Corporation, Limited, Ontario, Canada

Filed July 16, 1973, Ser. No. 379,277
Int. Cl. C27d *9/74*
U.S. Cl. 266—4 R **12 Claims**

1. An apparatus for hardening an elongated steel pipe by quenching with a cooling medium, said apparatus comprising

an elongated container dimensioned to receive the hot pipe to be hardened, means for supporting the hot pipe in a predetermined position in said container, a liquid cooling medium nozzle having a tip for introducing cooling medium into the pipe through said tip, means for moving said nozzle between a retracted position in which the tip thereof is spaced from an end of said pipe to allow removal of said pipe from said container and an extended position in which the tip lies within said end of said pipe, inlet means for introducing cooling medium into said container so as to pass into said pipe through



said tip of said nozzle located in said end of said pipe and also to pass around the outside of said pipe and isolator means in fluid communication with said nozzle, said isolator means being movable to vary the proportion of cooling medium entering through said inlet means and passing into and through said pipe through said nozzle relative to the proportion of cooling medium passing over the outside of said pipe whereby to control the rate of cooling of the inside surface relative to the rate of cooling of the outside surface of said pipe.

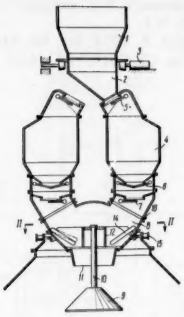
3,877,686

BLAST FURNACE CHARGER

Nikolai Konstaninovich Leonidov, ulitsa 1812, Goda, 7, kv. 45; Lev Yakovlevich Levin, ulitsa Kremenchugskaya, 13, kv. 24; Petr Platonovich Ipatov, Prospekt Mira, 103, kv. 90, all of Moscow; Nikolai Ivanovich Krasavtsev, bulvar Pushkina, 27, kv. 15, Donetsk; Evgeny Dmitrievich Shtepa, ulitsa Artema, 76, kv. 35, Donetsk; Jury Markovich Gerasimenko, ulitsa Postysheva, 25, kv. 11, Donetsk; Valery Stepanovich Degtyarev, ulitsa Artema, 119, kv. 19, Donetsk; Alexandr Fedorovich Rybtsov, ulitsa Postysheva, 122, kv. 47, Donetsk; Anatoly Dmitrievich Tankin, ulitsa Stadionnaya, 5, kv. 76, Donetsk; Alexandr Efimovich Sukhorukov, ulitsa Prostornaya, 34, korpus 1, kv. 74, Moscow; Mikhail Mikhailovich Kovylin, Prospekt Mira, 99, kv. 246, Moscow; Jury Lvovich Markovsky, Prospekt Mira, 101a, kv. 32, Moscow; Evgeny Makarovich Ryazanov, Prospekt Mira, 103, kv. 232, Moscow; Vyacheslav Alexeevich Altukhov, Novo-Ostankinskaya ulitsa, 18, kv. 54, Moscow; Valentin Alexeevich Kononov, ulitsa Bazhova, 1, kv. 90, Moscow, and Evgeny Ivanovich Yasakov, ulitsa Fotichevoi, 12, kv. 138, Moscow, all of U.S.S.R.

Filed Apr. 23, 1973, Ser. No. 353,671
Int. Cl. C21b 7/00
U.S. Cl. 266—27 **2 Claims**

1. A charger for charging a blast furnace with a mixture comprising: at least four lock hoppers; a taper hopper being disposed beneath the outlets of said lock hoppers along the furnace axis; vertical partitions dividing the inner space of the tapered portion of said taper hopper into zones the number of which corresponds to the number of said lock hoppers, each of said zones being disposed under a respective lock hopper; means for dividing a charging mixture from said lock hoppers into several flows distributed throughout the furnace section, said dividing means provided beneath the outlets of said lock hoppers in each of the zones of the taper hopper; and a bell mounted under said taper hopper along the furnace axis and



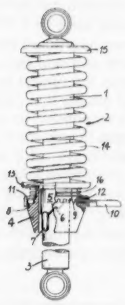
rigidly fixed to it to form with said taper hopper a gap for mixture passage.

3,877,687

SUSPENSION UNIT

Walter Sarti, Bologna, Italy, assignor to Sebac S.p. A., Bologna, Italy

Filed Jan. 26, 1973, Ser. No. 326,619
Claims priority, application Italy, Jan. 28, 1972, 4716B/72
Int. Cl. B60e 17/00
U.S. Cl. 267—8 R **1 Claim**



1. A motor vehicle suspension unit of the type including means for varying the static load of the suspension, comprising a pair of cylindrical elements telescopically guided one within the other and each having means rigid therewith defining supporting plates, a coil compression spring having ends retained by said supporting plates, a sleeve member surrounding one of said cylindrical elements and angularly and axially adjustable thereon, said sleeve member having an inner cam surface defining recesses axially and radially spaced from one another, a lug member rigid with said one cylindrical element for engagement into said recesses, and means for positive displacement of said sleeve member thereby causing said lug member to engage a different one of said recesses for adjusting the static load of the suspension, wherein, according to the improvement, said sleeve member has an annular shoulder defining a plurality of axial notches arranged angularly spaced apart and said means for positive displacement of said sleeve member comprise a ring element surrounding said sleeve member and having a radial operating lever and at least an axial projection for engagement with said axial notches, said means further including a spring urging said axial projection into one of said notches, whereby said ring element is axially displaceable with respect to said sleeve member and disen-

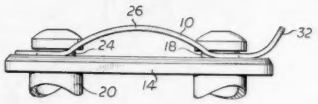
gageable therefrom for bringing said operating lever into a non-annoying rest position after positive displacement of said sleeve member.

3,877,688

SPRING CLIP FOR SPROCKET OR ROLLER CHAIN

Almon Minor McCarty, Montour Falls, N.Y., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Nov. 23, 1973, Ser. No. 418,535
Int. Cl. F16g *13/08*
U.S. Cl. 267—159 **7 Claims**



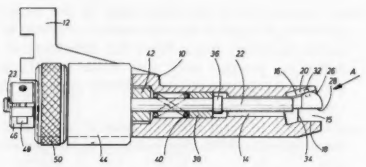
1. In combination with a chain having a plurality of links connected by chain pins with said pins having end portions extending outwardly of said links, a spring clip for application and removal from said end portions of a pair of adjacent chain pins, which clip comprises a resilient element having a pair of spaced openings and an arched center portion; said openings encircling the end portions of said pins when pressure is applied to the arched central portion tending to flatten the clip; said clip openings frictionally engaging end portions of said pins upon release of said pressure; said clip maintaining said links in assembled relationship.

3,877,689

WORK CLAMPS

Sidney Clarke Todd, Maidenhead, England, assignor to Pierce-All Manufacturing Limited, Slough, England

Filed Aug. 6, 1973, Ser. No. 386.227
Int. Cl. B25b *1/18, 5/08*
U.S. Cl. 269—32 **4 Claims**



1. A clamping device comprising, in combination:

an elongate clamp body having an axially extending bore therethrough, said body having a nose end portion provided with a clamping surface at one side of said bore which clamping surface is parallel to the axis of the bore and a camming face at the other side of said bore diametrically opposed to said clamping surface, said camming face extending axially with respect to said bore and being inclined with respect to the axis of said bore, said nose end portion also having abutment surfaces at opposite sides of said bore and contained in a plane normal to the axis of the bore and inwardly a predetermined distance from the end of said nose end portion so as to provide a datum plane for a workpiece;

a clamp rod reciprocable within said bore, said clamp rod having one end portion dimensioned to provide clearance within said bore and terminating in a head engaged with said camming surface, said head having a clamp face facing but spaced from said clamping surface and said one end portion being of a length sufficient to permit substantial cantilever deflection thereof;

centering means on an intermediate portion of said clamp rod for centering said intermediate portion of the clamp rod within said bore; and

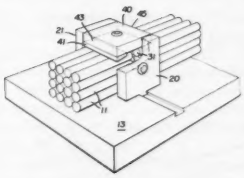
means for forcibly moving said clamp rod axially of said bore to cause said head to move along said camming face and deflect said one end portion of the clamp rod in cantilever fashion from said centering means whereby said clamp face deflects toward said clamping surface while moving axially with respect thereto so as to effect a pinching action on a workpiece while also urging it positively against said abutment surfaces.

3,877,690

PRESSURE VISE

Andrew C. Owens, Detroit, Mich., assignor to Albert D. Lambert, Detroit, Mich., a part interest

Filed Mar. 4, 1974, Ser. No. 448,034
Int. Cl. B23q *5/26*
U.S. Cl. 269—265 **8 Claims**



1. In an apparatus for feeding elongated stock toward a work station said stock having a leading end and a trailing end, and being supported by a work surface, said apparatus including side members generally perpendicular to the work surface and parallel to the direction of feed, each having front and rear bearing portions and a top guide member having a front bearing portion and a rear bearing portion, both opposing said work surface, the improvement comprising:

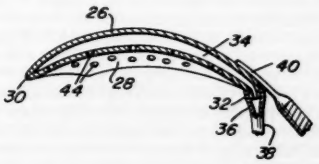
said front bearing portion of at least one of said members being spaced closer to said work surface than said rear bearing portion for concentrating the force of said member onto said elongated stock and for holding said stock firmly between said side members said top member and said work surface against rotation.

3,877,691

SHIELD FOR VENTING GASES AWAY FROM ANESTHESIOLOGIST

Beatrice D. Foster, 8191 Colony Dr., Grosse Ile, Mich. 48138

Continuation-in-part of Ser. No. 288,341, Sept. 12, 1972, Pat. No. 3,813,092. This application Feb. 26, 1974, Ser. No. 446,026
Int. Cl. A61g *13/00*; **A61m** *1/00*
U.S. Cl. 269—322 **7 Claims**



1. In combination with an operating table of the type including a portion thereof adapted to have the head of a person disposed on said table and to be administered a gas form of

anesthesia rested thereon, a shield for dispostion above the head of said person, said shield comprising a generally horizotal panel structure including spaced upper and lower panel sections having corresponding marginal edges sealed relative to each other and defining a closed area between said panel sections, said structure including an outlet opening into the area between said panel sections and adapted to have the inlet end of a vacuum line connected thereto, the lower panel section having a plurality of spaced inlet openings formed therethrough opening into said area, and support means supporting said shield in elevated position over said table portion.

3,877,692

DEVICE FOR INSERTING PRINTED PRODUCTS, FOR EXAMPLE NEWSPAPER INSERTS, INTO OTHER PRINTED PRODUCTS, FOR EXAMPLE NEWSPAPERS

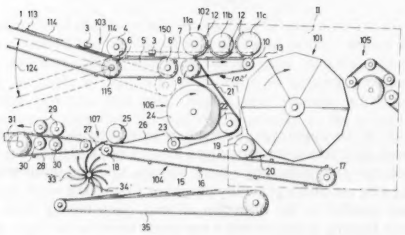
Willi Kluge, and Reinhard Kluge, both of D-63 Giessen, Kugelberg 55, Germany

Filed Dec. 1, 1972, Ser. No. 311,169

Claims priority, application Germany, Dec. 8, 1971, 2160772

Int. Cl. B65h *5/30*

U.S. Cl. 270—55 **18 Claims**



1. In a device for inserting second printed products into multilayered first printed products having a folded edge, said device having a rotating drum rotatable about a horizontal axis, a plurality of support surfaces mounted on the periphery of said drum and adapted to receive said first printed products thereon, a supply device including a feed mechanism for feeding said first printed products substantially tangentially to said drum and depositing one of said first printed products onto one of said support surfaces, a plurality of holders located adjacent each of said support surfaces for holding one part of said first printed product on an associated support surface, a plurality of opening devices mounted on said drum for controlling the amount of opening of said first printed products and a throwing-in device for throwing in said second printed products into said opened first printed products, the improvement comprising wherein each of said opening devices includes at least one drivable belt which is located adjacent each of said associated support surfaces between which said folded edge of said first printed products, which are to be opened, is received, stop means located adjacent each of said support surfaces and adapted to be engaged by said folded edge of said first printed products and drive means for driving each of said drivable belts for moving said folded edge on each of said first printed products into engagement with one of said stop means to effect a bulging of said first printed products through a pressing of said folded edge against said stop means, each of said plurality of holders including means supporting same for movement into said bulge to hold said one part on said associated support surface to thereby permit the other part of said first printed products to move radially outwardly from said drum to a limit position defined by said opening devices by one of a centrifugal force effect and gravitational force effect to define an opening for receiving said second printed products.

3,877,693

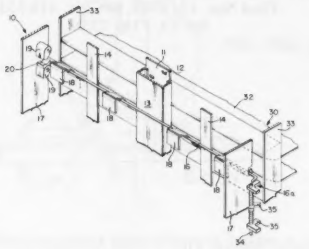
DISTRIBUTOR ASSEMBLY FOR SHEET SORTING DEVICE

Osceola J. Gerbracht, Seattle, Wash., assignor to Norfin, Inc., Seattle, Wash.

Filed Sept. 13, 1972, Ser. No. 288,674

Int. Cl. B65h *39/02*

U.S. Cl. 270—58 **13 Claims**



1. A sheet sorting device for delivering sheets in succession to a plurality of spaced receiver stations comprising;

a conveyor for moving sheets in succession along a course opposite the receiver stations,

deflector units opposite each receiver station and adjacent the conveyor, each deflector unit having at least one deflector finger carried thereby,

means mounting each deflector unit for movement of its deflector finger between a first deflecting position in the path of the moving sheets being conveyed along the conveyor to deflect a moving sheet into the receiver station associated therewith and a second non-deflecting position permitting a subsequent moving sheet to bypass the receiver station and strike the deflector finger of the deflector unit of the successive station, said mounting means mounting the deflector units such that, upon impact of a moving sheet against the associated deflector fingers, sufficient momentum is imparted thereto to initiate movement thereof to the second position,

assist means associated with each of the deflector units providing a positive force to assist movement of the associated deflector finger from the deflecting to the non-deflecting position only after initial impact and movement of the deflector unit caused by impact of the moving sheet and

reset means to reset selected ones of said deflector units from the non-deflecting position to the deflecting position.

3,877,694

SHEET FEEDING APPARATUS HAVING TRAVELLING FEED GRIPPERS

Arno Wirz, Bammental, Germany, assignor to Heidelberger Druckmaschinen Aktiengesellschaft, Heidelberger, Germany

Filed July 19, 1972, Ser. No. 273,191

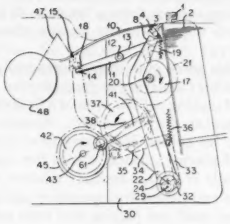
Claims priority, application Germany, July 23, 1971, 21 36 867

Int. Cl. B65h *5/14*

U.S. Cl. 271—14 **3 Claims**

1. Sheet feeding apparatus comprising a feed table, feed grippers having gripper heads movable back and forth to transfer sheets on said feed table, said feed table having slots through which said feed grippers are adapted to extend, operable means operable to move said feed grippers from a first to a second position while said gripper heads are disposed above said feed table to transfer a sheet, said operable means also being operable to displace said feed grippers to lower the latter so that said feed grippers are disposed below the top surface of said feed table for the major portion of the return movement of said feed grippers to said first position, said

operable means comprising a lever on which said feed grippers are mounted, a fulcrum bearing about which said lever is pivoted, a shaft having an end portion which is eccentrically offset relative to the axis of the shaft, said offset end portion defining said fulcrum bearing on which said lever is pivotally mounted, drive means for rotating said shaft back and forth in



synchronism with the operating cycle of the apparatus to displace said fulcrum bearing over a predetermined angle, a crank wheel, a connecting rod between said crank wheel and said lever, whereby rotation of said crank wheel oscillates said lever, said crank wheel being rotationally displaced upon rotation of said shaft and displacement of said fulcrum bearing.

3,877,695

DEVICE FOR REMOVING THE UPPER PIECE FROM A CUT LAY

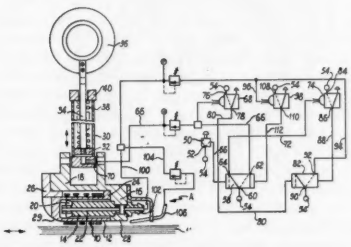
George Carroll, 12 Palmerston Rd., Woodsmoor, Stockport in the County of Cheti, England

Filed June 12, 1973, Ser. No. 369,358

Claims priority, application United Kingdom, June 14, 1972, 27755/72

Int. Cl. B65h *3/00, 3/14*

U.S. Cl. 271—18 **7 Claims**



1. A device for removing one piece from a horizontal cut lay comprising a plate which is at least in part substantially horizontal, gripping means including at least two elements movable toward and away from each other in a direction which is substantially horizontal, means for moving both the plate and gripping means together between a first position wherein the elements of the gripper are immediately adjacent the cut lay and a second position wherein the gripper is spaced from the cut lay, means for directing a stream of air under said plate at least when said plate and gripper are in said first position and means for closing said gripper elements after said stream of air is applied so as to engage one piece of the cut lay which is raised by said stream of air between said elements and means for opening said gripper elements when said gripper and plate are in the second position so as to release said one piece of the cut-lay.

3,877,696

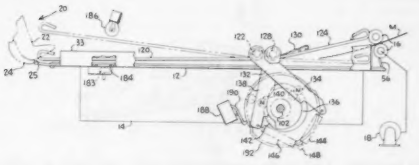
SHEET ORIENTING APPARATUS

Joseph F. Miciukiewicz, Trumbull, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Nov. 8, 1973, Ser. No. 413,836

Int. Cl. B65h *9/10*

U.S. Cl. 271—227 **14 Claims**



1. A device for orienting sheets in a predetermined dimensional and timed relationship between two independently operable instrumentalities, said device comprising:

A. sheet support means adapted to be positioned between the instrumentalities to receive a sheet from one instrumentality and deliver the sheet to the other instrumentality, said sheet support means being dimensioned to be at least slightly larger in length and width than the corresponding dimensions of the sheet to be handled,

B. means for feeding sheets onto said sheet support means in substantially flat condition,

C. sheet guide means mounted on said device over substantially the entire extent of said support means in closely spaced relationship with said support means for maintaining a sheet thereon in substantially flat condition,

D. movable side edge registering means mounted on said device for establishing a predetermined position of a sheet on said support means laterally with respect to the direction of travel of the sheet along said support means,

E. movable lead edge registering means mounted on said device adjacent an inlet end of said sheet orienting device in position to engage the trailing edge of a sheet deposited on said support means by said feeding means for establishing a predetermined position of the sheet on said support means longitudinally with respect to the direction of travel of the sheet along said support means,

F. actuating means for moving said side edge registering means and said lead edge registering means in a predetermined timed sequence, and

G. means operable to initiate operation of said actuating means when a sheet is deposited upon said support means by said feeding means.

3,877,697

SELF-UPRIGHTING BASEBALL BATTING PRACTICE TEE

Alfred E. Lersch, Forest Hills, Pa., assignor to A. Evans Lersch Corporation, Forest Hills, Pa.

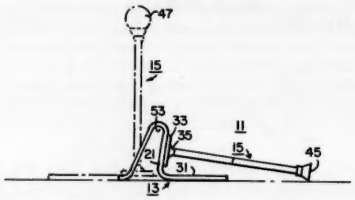
Filed Feb. 1, 1974, Ser. No. 438,688

Int. Cl. A63b *69/40*

U.S. Cl. 273—26 R **4 Claims**

3. A tee for baseball batting practice including a resilient mat to be disposed freely on a generally horizontal surface and a vertical member supported by said mat and extending vertically therefrom when said mat is on said horizontal surface, said member including, at the top thereof, means for holding a baseball, and said member extending to a height above said mat such as to accommodate the person practicing the batting whereby the holding means positions a baseball in a position where it may be struck during baseball batting practice, said mat being of such thickness and engaging said surface over such large area that when said member is undesirably struck and displaced from its vertical position, said mat is deformed and by its resilience exerts a restoring force to restore said member to its vertical position, the said tee also including a

plate disposed on said mat at the junction of said vertical member and said mat about the region from which said member extends from said mat and being penetrated by said vertical member, said plate cooperating with said mat to restore said member to the vertical position on undesirable displacement of said member from the vertical position.



3,877,698

BASEBALL BAT WITH REPLACEABLE BALL-STRIKING PORTION

Michael A. Volpe, 447 Natchez St., Pittsburgh, Pa. 15211

Filed Nov. 28, 1973, Ser. No. 419,483
Int. Cl. A63b *59/06*
U.S. Cl. 273—72 R **8 Claims**

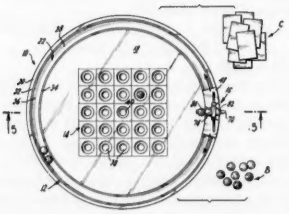
1. A composite baseball bat with a replaceable ball-striking portion, comprising a handle having front and rear ends, a stem joined to the front end of the handle and extending forward therefrom, a removable barrel provided with a longitudinal bore receiving substantially all of said stem, the diameter of said bore being greater than the diameter of the stem to space the barrel from the stem, the barrel having an outer ball-striking surface, said stem being provided with a plurality of annular grooves spaced lengthwise thereof, and elastic rings in at least most of the grooves and projecting therefrom, said rings being compressed between the stem and the encircling barrel to hold the barrel in place and space it from said stem.

3,877,699

TETHERED BALL POKER GAME

Lawrence L. Reiner, 1 Hickory Ln., Woodbury, N.Y. 11797

Filed Jan. 26, 1972, Ser. No. 220,840
Int. Cl. A63d *13/00;* **A63f** *7/10*
U.S. Cl. 273—119 R **11 Claims**



3. A game comprising a game board having a playing surface, said game board having a circumference and being adapted to receive a plurality of playing balls, an impact-transfer device, means for movably mounting said impact-transfer device for 360° movement about said circumference at various locations about said playing surface and means for supporting one of said playing balls on said impact-transfer device in impact-transfer relation to said impact-transfer device, said impact-transfer device including an impact-transfer object which is stationary with respect to said impact-transfer device, said playing ball-supporting means being constructed and arranged to support said one playing ball in an impact-transfer relation to said impact-transfer object and means for striking said impact-transfer object to propel said playing ball onto said playing surface from a location determined by the position of said impact-transfer device about said playing surface.

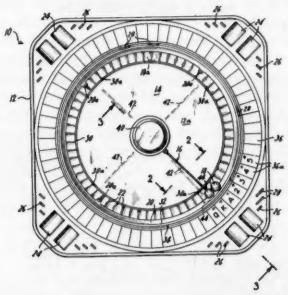
10. A portable game comprising a generally circular game board which defines a playing surface adapted to receive each of a plurality of playing balls in each of a field of ball-capturing depressions, means for removably mounting an impact-transfer device for guided **360°** movement about the circumference of said playing surface, means for supporting one of said playing balls in impact-transfer relation to said impact-transfer device and means for operating said impact-transfer device to propel said one playing ball onto said field of ball-capturing depressions from a location about the circumference of said playing surface, said game including playing card indicating means in association with each of said ball-capturing depressions whereby a playing card value is assigned to each of said depressions a plurality of game cards, each of said game cards having a playing card indicating means thereon substantially identical to the playing card indicating means assigned to each of said respective depressions.

3,877,700

COMBINED GAME OF CHANCE AND SKILL

Walter Moe, Long Island, N.Y., assignor to Aurora Products Corporation, West Hempstead, N.Y.

Filed Jan. 15, 1973, Ser. No. 323,840
Int. Cl. A63d *3/02*
U.S. Cl. 273—119 R **12 Claims**



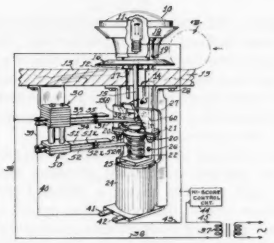
1. A combined game of chance and skill comprising a game board including a substantially circular ball-traversing course having ball-receiving pockets adapted to receive an indicating ball when propelled along said course, said circular ball-traversing course being defined by two concentric walls formed in said game board and connected by said ball-receiving pockets, an indicating ball on said course between said walls, ball-propelling means operable by a player to propel said indicating ball along said course to come to rest in one of said ball-receiving pockets, said ball-propelling means including a rotatable support centrally mounted on said game board, a radially-extending resilient actuating arm carried by said support and striker means carried at the end of said actuating arm, means for maintaining said support stationary relative to said game board upon actuation of said actuating arm, said striker means carried by said arm and extending over said course in position to contact and propel said indicating

ball in a generally circular path along said course and indicia means for each of said ball-receiving pockets.

3,877,701
PIN-BALL SURFACE GAME DEVICE HAVING LOCK-OUT BALL BUMPER

Colin Edwin Foster, Bensonville, and Joseph Edward Lally, Crystal Lake, both of Ill., assignors to Bally Manufacturing Corporation, Chicago, Ill.

Division of Ser. No. 286,003, Sept. 5, 1972, Pat. No. 3,826,883. This application June 11, 1974, Ser. No. 478,293
Int. Cl. A63f 7/10
U.S. Cl. 273—119 A **5 Claims**

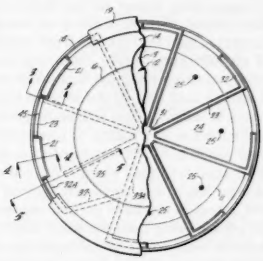


1. A bumper for pinball games having a ball-rolling panel and means for launching a ball for movement thereon, said bumper including a pedestal member adapted to stand in upright relation to the ball-rolling surface with a vertical axis approximately normal to said panel and having a target element in the form of a trigger disc circumambient of the pedestal and yieldingly spring-urged into a normal position to lie in a plane substantially at right angles to said axis adjacent said surface for engagement and tilting from said normal position by a ball, said target element including a central stem projecting freely through said panel with a lower end disposed in a normally pendant condition along said axis for cooperation with switch means beneath the panel; switch means disposed adjacent said lower stem end and including an elongated actuating member having a free end disposed beneath said lower stem end and provided with means yieldingly urging the actuating member to move said free end toward the said stem end; lock-out means comprising a formation at said free end of the actuating member providing an area constituting a land of predetermined small area engageable with said lower stem end in the normal pendant condition of the latter whereby said switch means is maintained in a first operated condition, the area of said land being such that the stem end will escape therefrom responsive to movement of the stem a small amount from said normal position when said trigger disc is tilted by a ball, said lock-out formation including a blocking portion adjoining said land and effective to block movement of the stem end back onto the land whereby the switch means is maintained in a second operated condition until said actuating member is reset by movement of the free end region thereof, at least, in a direction axially away from the lower stem end a distance permitting the stem end to clear said blocking portion; and resetting means operative to displace the actuating member in reset movement as aforesaid.

3,877,702
MARBLE GAME TABLE WITH PERIPHERAL POCKETS AND CUSHIONS

Joseph E. Saliger, 16106 Ludlow St., Granada Hills, Calif. 91344

Filed July 16, 1973, Ser. No. 379,390
Int. Cl. A63d 13/00
U.S. Cl. 273—125 R **5 Claims**



1. A marble game table comprising, in combination: a base, a playing surface on the base, a peripheral rim about the playing surface, a plurality of spaced billiard cushions adjacent to the playing surface about the rim, a plurality of playing surface apertures adjacent the rim, a respective opening leading from the playing surface into each respective aperture, the circumferential extent of all billiard cushions equalling the circumferential extent of all playing surface openings, a marble collector, a trough from each aperture to a collector, a marbie size separator extending from the collector, a pair of return chutes connecting to the separator remote from the collector, and manipulatable means for releasably retaining marbles in each return chute.

3,877,703
WORD GAME

Donna J. Pierre, 1213 Rosedale Ave., Bronx, N.Y. 10472

Filed Nov. 8, 1973, Ser. No. 413,882
Int. Cl. A63f 9/06
U.S. Cl. 273—130 E **16 Claims**

8. A solitaire word game comprising a fixed matrix of a plurality of alphabet letters arrayed in a fixed predetermined sequence, established prior to the play of the game and exposed to view throughout the game, said alphabet letters each being assigned a predetermined score value, and a game board having a plurality of letter boxes formed thereon, said letter boxes including a plurality of sets of bonus score boxes, at least one of said sets representing a multiple of the score of a letter placed in a box of the set and another of said sets representing a multiple of the sum of the letter scores of a word

formed on said game board and having a letter thereof in one of its boxes, said matrix comprising a plurality of rows and columns of alphabet letters arrayed in said predetermined fixed sequence and having a plurality of sets of letters arranged in a predetermined sequence with each set of letters having the same number of letters therein, at least some of the letters in the first set in said matrix being used to form a first word on same game board with only one letter placed in any letter box and the unused letters in said first set being added to immediately succeeding letters in the fixed sequence of letters in the fixed matrix to form a group of letters equal in number to the letters of said first set and from which a second word is formed on said game board extending from and including a letter of said first word; said first set of letters comprising the first row of said matrix; the unused letters in said group being added to immediately succeeding letters in the fixed sequence of letters in said matrix to form another group of letters equal in number of the letters of said first set and from which a third word is formed extending from and including a letter of at least one of the previously formed words; the successive matrix letters in the fixed predetermined sequence of letters in said matrix being used for form successive letter groups in this manner from which group words are formed on said game board until no further words can be formed from the letters in the matrix, whereby a player of the game may calculate a total score by the addition of the score of the values of letters used and the bonus scores for letters placed in bonus boxes.

3,877,704

APPARATUS FOR PLAYING A GOLF GAME

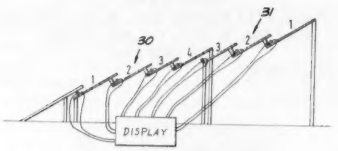
Ralph Mytton Bayley, One Dunsmore, The Hoe, Carpenders Park, Watford, Hertfordshire, England

Filed Nov. 29, 1973, Ser. No. 420,096

Claims priority, application United Kingdom, Dec. 4, 1972, 55935/72; Feb. 21, 1973, 08462/73; Feb. 26, 1973, 09214/73; Apr. 12, 1973, 17772/73; June 14, 1973, 28393/73

Int. Cl. A63b *69/36*

U.S. Cl. 273—176 A **14 Claims**



1. A golf game of the kind comprising a playing area having a plurality of targets and an individual striking area for each target, one of said targets and its striking area being provided on a putting surface and comprising a hole or cup in the putting surface and a plurality of striking markers at different distances from the hole, and another of the targets being provided with a plurality of indicating zones, the improvement being that said another target has

a. at least two separate smooth surfaces defining different indicating zones of the target,

b. means to mount the surfaces on the playing area with the surface nearer the striking area providing a ramp at ground level up which a golf ball hit from the striking area may run and with the next surface providing a ramp spaced behind the forward surface by a distance sufficient to allow a golf ball to pass between the surfaces and projecting upwardly above the level of the upper edge of the forward surface so that a golf ball which passes over the first surface will roll onto the second surface and

c. means provided on each of said surfaces so that a ball landing directly on that surface does so with little or no rebound.

3,877,705

DIAMOND SCANNING ELEMENT

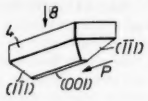
Gunter Joschko; Karl-Ekkehard Schriefl, and Hans-Jurgen Winter, all of Berlin, Germany, assignors to Ted Bildplatten Aktiengesellschaft, AEG-Telefunken, Teldec Zug, Switzerland

Filed Nov. 14, 1972, Ser. No. 306,208

Claims priority, application Germany, Nov. 19, 1971, 2158216

Int. Cl. G11b *3/44, 9/00*

U.S. Cl. 274—38 **44 Claims**



1. In a device for scanning an information signal carrier having a groove defined by a groove surface, the device including a signal scanning means for scanning the information signals of said carrier, and a motive means for creating a relative velocity between said scanning means and said carrier along the groove during the scanning of information stored on said carrier, the improvement wherein:

the signal scanning means includes an element suited at least for guiding said signal scanning means in said groove, said element having a rounded tracng surface which faces toward the information carrier and contacts a portion of the groove surface during operation and comprising a diamond having a natural crystal face portion which bounds the tracing surface and which enables recognition of the crystallographic orientation of the element, said element being aligned crystallographically so that a wear resistant crystallographic direction of the element extends approximately parallel too the direction of said relative velocity.

3,877,706

MECHANICAL SEAL ASSEMBLY FOR GLASS-LINED MIXER TANKS

Leonard L. Haas, West Chester, Pa., and Seymour Schlosberg, East Brunswick, N.J., assignors to Philadelphia Gear Corporation, King of Prussia, Pa.

Filed Oct. 23, 1973, Ser. No. 408,825

Int. Cl. F16j *15/34*

U.S. Cl. 277—41 **10 Claims**

1. A corrosion-resistant unit package mechanical seal assembly for sealing a rotatable shaft which extends through an opening in a tank wall, said seal assembly being removable as a unit by sliding movement along said shaft, said unit assembly including:

a. a fixed annular upper stationary seal face having means for receiving the ends of draw rods for removal of said unit;

b. a corrosion-resistant annular lower stationary seal face;

c. a holder having an annular central hub portion and upper and lower collar portions;

d. means securing said hub portion to said rotatable shaft at a point approximately midway between the faces of said upper and lower stationary seal faces;

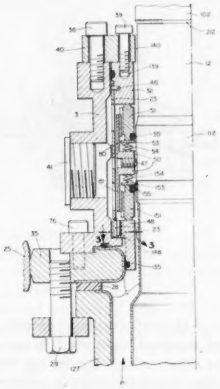
e. said upper and lower collar portions of said holder being spaced radially from said rotatable shaft forming upper and lower annular spaces therebetween;

f. said upper and lower collar portions having internal projections;

g. annular upper and lower rotatable seal faces within said upper and lower annular spaces and having external slots receiving said collar projections;

h. spring means within said annular spaces forcing said upper and lower rotatable seal faces toward said upper and lower stationary seal faces, respectively;

i. annular seal means between said lower rotatable seal face and said rotatable shaft, and



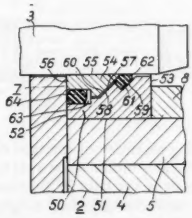
j. an annular spacer-and-support sleeve secured to an depending from said upper stationary seal face external to said rotatable seal faces and isolated from contact by fluid from said vessel,

k. said spacer-and-support sleeve having means at its lower end for supporting said lower stationary seal face and for preventing rotation thereof.

3,877,707
HIGH PRESSURE SEAL

Pertti Syvakari, Barongatan 7, 5-252 60 Helsingborg, Sweden

Filed Apr. 26, 1974, Ser. No. 464,461
Claims priority, application Sweden, June 6, 1973, 7379360
Int. Cl. F16j *15/56*
U.S. Cl. 277—190 **4 Claims**

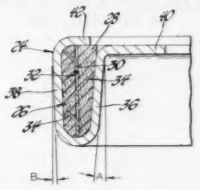


1. A high-pressure seal to effect sealing between the wall of a high pressure cylinder cylinder and a die or an axially movable plunger projecting into the high pressure cylinder, said seal including a seal ring holder and outer and inner sealing rings of metal, the outer ring having an outer cylindrical surface abutting the cylindrical wall and an end surface abutting the seal ring holder, and the inner ring having an inner cylindrical surface abutting the die or the plunger and an end surface abutting said rings holder, the said rings **(9, 12)** and the rings holder **(6)** forming an annular groove **(15)**, and an elastic sealing ring **(16)** in said groove **(15)** which seals between the sealing rings **(9, 12)** and the ring holder **(6)**.

3,877,708
GASKET

Robert R. Skrycki, Grosse Ile, Mich., assignor to McCord Corporation, Detroit, Mich.

Filed Apr. 2, 1973, Ser. No. 347,279
Int. Cl. F16j *15/12*
U.S. Cl. 277—235 R **8 Claims**

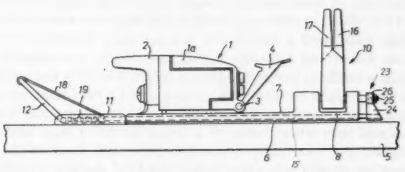


1. An endless gasket for perfecting a seal between two members, comprising: an endless outer shell; a core disposed with said shell; said shell having first and second sides which, as viewed in cross section, taper toward one another; a flange connected to said first side extending generally laterally away from said shell, said flange extending a substantially constant distance from said first side about the periphery of said shell; a lip connected to said second side extending generally in the direction of said flange and terminating short of said first side covering at least a portion of said core to retain the same; and means interconnecting said sides for allowing said sides to move toward one another when the exposed surfaces of said sides are engaged by and compressed between the two members to permit compression of said shell.

3,877,709
SKI BRAKE

Helmuth Fritz, Jestetten, Germany, assignor to Karl Altenburger, Montreux-Territet, Switzerland

Filed Dec. 3, 1973, Ser. No. 421,087
Claims priority, application Switzerland, Dec. 5, 1972, 17683/72; May 21, 1973, 7204/73
Int. Cl. A63c *7/10*
U.S. Cl. 280—11.13 B **12 Claims**



1. A ski brake for skiis, especially for use with safety ski bindings, comprising a ski brake means, a control device, a connection element which actuates the control device and arranged between the ski boot and the ski binding and a ski brake means, said ski brake means being arranged to one side of the ski binding, said ski brake means having at least one brake jaw possessing a respective locked position for the arrested- and preparatory positions respectively, of the ski brake means and moving into a ski braking position at the running surface of the ski upon release of the ski binding, as well as assuming the preparatory position upon actuation of the control device upon insertion of the ski boot into the ski binding, the improvement comprising said connection element being arranged lenghtwise of the ski and constructed as a member which can be actuated against the action of spring means said connection element comprising a traction element embodying said member and guided along the side binding for carrying out a substantially linear movement, an actuation bracket arranged at the region of the ski boot, means for

mounting said actuation bracket on the ski, means for connecting said traction element with said actuation bracket, said traction element being arranged between said actuation bracket and said control device.

3,877,710

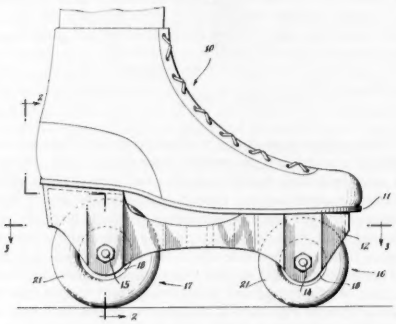
PNEUMATIC TIRED ROLLER SKATE

Ernest S. Nyitrai, 127 Lockwood Ave., Stamford, Conn. 06902

Filed Jan. 2, 1974, Ser. No. 429,960

Int. Cl. A63c *17/06*

U.S. Cl. 280—11.23 **1 Claim**



1. A roller skate comprising in combination, a unitary rigid frame, a rigid sole plate mounted on said frame supporting a heeless skater's boot, said sole plate being shaped to define a sole portion and a raised heel portion, parallel opposed sidewalls on the opposite ends of said frame extending in a direction substantially at right angles to the sole of said boot and spaced apart a distance at least equal to the width of said boot, said sidewalls forming therebetween front and rear openings respectively beneath the sole portion and heel portion of said sole plate, front and rear axles mounted parallel to each other in said front and rear openings respectively and extending between said parallel opposed sidewalls at each end of said frame, a cylindrical wheel rotatably mounted on each of said front and rear axles, each said wheel supported on its respective axle by ball bearings spaced apart at the outer extremities of the wheel in close proximity to the adjacent axle supporting side walls, and a pneumatic tire centrally mounted on each said wheel and rotatable within one of said openings to provide a resilient surface engaging roller, whereby the weight of a wearer falls between the spaced apart wheel bearings at all angles to which the skate may be inclined during use, the tire on said rear wheel being of a larger diameter than said front wheel, and extending upwardly above the level of the sole portion of said sole plate below the heel portion of said sole plate.

3,877,711

JAWS FOR A SAFETY SKI BINDING

Horst Koehler, Immenstadt, Germany, assignor to Josef Ess a/k/a Allgaeuer Skibeschlaege Fabrik, Sonthofen, Germany

Filed Apr. 23, 1973, Ser. No. 353,861

Claims priority, application Germany, Apr. 26, 1972, 2220560

Int. Cl. A63c *9/08*

U.S. Cl. 280—11.35 T **1 Claim**

1. A jaw for a safety ski binding comprising a housing including:

A. means for fastening the housing to the ski, said fastening means comprising a bottom plate and screws,

B. a vertical shaft rotatably supported in the housing,

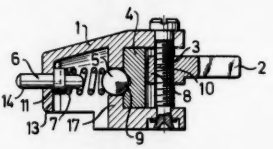
C. a sole holder pivotably positioned about the vertical shaft,

D. locking means comprising a spring-loaded ball including means for adjusting the load thereof,

E. an engagement bearing and a portion of the housing cooperating therewith including

1. means for connecting a part of the sole holder to the engagement bearing, and

2. means associated with the bearing for cooperating with the locking means,



F. a spring one end thereof engaging the ball, and

G. an adjustment member supported in the housing and engaged by the other end of the spring, the adjustment member including an adjustment pin comprising a flange impinged by said other end of the spring, said flange being of multistep structure one step thereof constructed to cooperate with the inner wall of the housing, a portion of the pin projecting out of the housing and being operable from the outside.

3,877,712

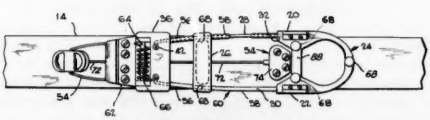
RELEASE SKI BINDING FOR DOWNHILL AND CROSS-OUNTRY

Kurt A. Weckeiser, 2450 42nd Ave., San Francisco, Calif. 94116

Continuation-in-part of Ser. No. 229,043, Feb. 24, 1972, abandoned. This application Mar. 21, 1974, Ser. No. 453,354

Int. Cl. A63c *9/08*

U.S. Cl. 280—11.35 D **32 Claims**



1. In a ski binding assembly of the type characterized by a release member movably mounted on a ski to engage and hold at least a portion of a ski boot in position thereon during normal ski usage, and disengage and release such portion of the boot from the ski in the event a twisting or uplifting force, or combination thereof, of predetermined magnitude be imposed upon the boot in respect to the ski, the release assembly comprising:

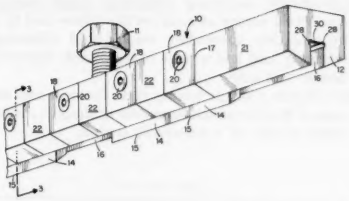
torsion means connected to said release member to urge the latter into engagement with a ski boot positioned for use on a ski, and to torsionally deflect in response to a disengaging movement of the release member connected to said means about an axis thereof normal to said disengaging movement, such torsional deflection causing a reactive force to be exerted by said torsion means on said release member in opposition to the disengaging movement thereof.

3,877,713

KEEL FOR SNOWMOBILE FRONT SKIS

Norman H. Mabie, 38 Fremont Sq., and John P. Putnam, 4 Rase Ave., both of Claremont, N.H. 03743

Filed Sept. 4, 1973, Ser. No. 393,726
Int. Cl. B62b 19/00
U.S. Cl. 280—28 6 Claims



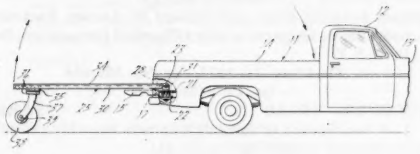
1. A keel assembly comprising:
an elongated, one-piece backing member having an elongated groove, or channel, with smooth, flat planar side walls and a bottom wall;
a predetermined number of relatively short blade members, spaced along said groove, each having smooth flat, planar side faces in contact with the side walls of said groove;
an equal predetermined number of relatively short clamp members, spaced along said groove, each operably associated with one of said blade members for clamping said blade member in said groove and providing lateral support thereto and
an equal predetermined number of individual fastening means, each for reversibly tightening and loosening each said clamp member against its blade member,
any one of said blade members being individually removable without removing the other blade member in said groove by loosening only the said fastening means holding the clamp member thereof.

3,877,714

TRAILER ATTACHMENT FOR PICK-UP TRUCK

John O. Black, 18094 Parkside, Detroit, Mich. 48221

Filed Jan. 25, 1974, Ser. No. 436,505
Int. Cl. B62d 21/14
U.S. Cl. 280—34 R 5 Claims



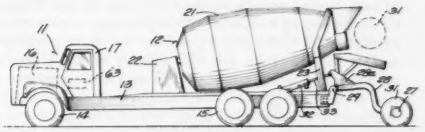
1. A truck and trailer combination comprising a truck having an elongated rectangular cargo deck, an elongated rectangular frame, pivot means at the rear portion of said truck cargo deck for releasably and pivotally connecting said frame to said deck for rotation about a horizontal pivot means located transversely of said truck and for transmitting tractive effort between said truck and said trailer, and a castered wheel disposed on the longitudinal centerline of said frame and spaced from said horizontal pivot means so as to be engagable with the ground when said frame extends rearwardly of said truck, the length and width of said frame being such as to be snugly received within the perimeter of said cargo deck when said frame is rotated upwardly and forwardly through approximately 180° so as to overlay said cargo deck.

3,877,715

AUXILIARY AXLE CONTROL SYSTEM

Earl C. Thayer, Cedarburg, and William H. Buelow, Brookfield, both of Wis., assignors to Rexnord Inc., Milwaukee, Wis.

Filed Dec. 21, 1973, Ser. No. 427,062
Int. Cl. B62d 61/12
U.S. Cl. 280—81 A 5 Claims



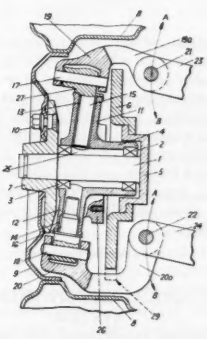
1. In a conventional truck comprising a frame, a braking system, a rearmost auxiliary axle having a pressurized suspension system, said suspension system including a compression member interposed between the truck frame and the axle to lift the rear of the truck by applying constant downward force upon the axle, and control means by which said force may be preselected by the truck operator; the combination of a quick-operating device which reduces said force to a nominal value in a nominal length of time, and a sensing means which is immediately responsive to the operation of the braking system of the truck and is operatively connected to said device whereby the auxiliary axle is depressurized when the truck is being brought to a stop with maximum braking effect.

3,877,716

WHEEL SUSPENSION FOR THE STEERED WHEELS OF VEHICLES INCLUDING A DISC BRAKE

Fritz Ostwald, Buchschlag, Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed July 5, 1973, Ser. No. 376,483
Claims priority, application Germany, July 7, 1972, 2233391
Int. Cl. B62d 7/08
U.S. Cl. 280—96.3 8 Claims



1. A wheel suspension for steered wheels of a vehicle comprising:
an axle for each of said steered wheels;
a steering knuckle cooperatively associated with said axle of each of said steered wheels to enable said steered wheels to be steered, each of said steering knuckles having a swivel axis that intersects the roadway at right angles to the driving direction outside a frame of said vehicle;
a brake disc connected to said axle of each of said steered wheels at a location between said frame of said vehicle and said swivel axis;

a pair of transversal swinging arms for each of said steered wheels adjacent said frame of said vehicle, said swinging arms assisting in steering said steered wheels;

a pair of pivot bearings disposed in each of said steering knuckles coaxial of said swivel axis; and

a pair of bridging elements for each of said steered wheels, each of said pair of bridging elements being connected between an associated one of said swinging arms and an associated one of said pivot bearings of an associated one of said steered wheels, each of said pair of said bridging elements having a section with a U-shaped configuration adjacent said brake disc to overlap the outer peripheral surface of said brake disc with one leg of said U-shaped configuration being connected to said associated one of said pivot bearings and the other leg of said U-shaped configuration being connected to said associated one of said swinging arms, said pivot bearings receiving flexural torque of an associated one of said bridging elements.

3,877,717

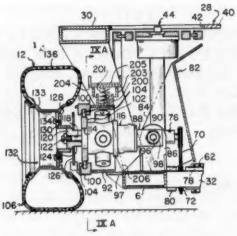
MULTI-PURPOSE VEHICLE FOR USE UNDERGROUND

Jon R. Swoager, Imperial, Pa., assignor to Automation Equipment, Inc., Imperial, Pa.

Division of Ser. No. 299,354, Oct. 20, 1972, Pat. No. 3,811,290, which is a continuation-in-part of Ser. No. 241,975, April 7, 1972, Pat. No. 3,793,966. This application Oct. 16, 1973, Ser. No. 406,970

Int. Cl. B62d *7/18*

U.S. Cl. 280—96.2 R **1 Claim**



1. In a wheeled vehicle, an independent susension and steering system for each wheel comprising:

a frame member pivotally mounted at its inboard end to the vehicle undercarriage and including at its outboard end a trunion member; a mounting plate pivotally mounted within said trunion; a wheel assembly rotatably mounted to the outboard side of said plate; compression means coupling said trunion and said vehicle undercarriage; and positioning means operably connected between said mounting plate and the outboard side of said vehicle undercarriage.

3,877,718

HIGH STRENGTH AUXILIARY AXLE SUSPENSION SYSTEM

Raymond M. Scanlon, Montgomery, Ala., and Stephen Turner, Jr., Youngstown, Ohio, assignors to TWM Manufacturing Company, Inc., Canton, by said Stephen Turner, Jr. and WDT, Warren, both of, Ohio, by said Stephen Turner, Jr.

Continuation-in-part of Ser. No. 293,617, Sept. 29, 1972, abandoned, which is a continuation-in-part of Ser. No. 273,552, July 20, 1972, abandoned. This application Feb. 27, 1973, Ser. No. 336,289

Int. Cl. B60g *1/46*

U.S. Cl. 280—124 F **17 Claims**

1. A lift-axle suspension system for a wheeled vehicle having a longitudinally extending frame member adjacent each side of said vehicle, said system when mounted on said vehicle connecting a wheel-bearing axle to said frame members in a manner to allow said axle to be alternately lowered and raised, thereby lowering said wheel into and raising said wheel from road engagement, the system comprising:

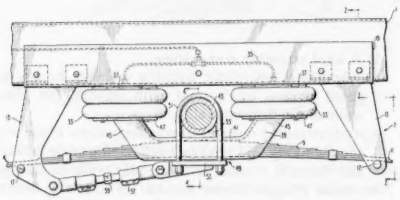
longitudinally extending normally upwardly biased leaf springs;

spring hanger means for retaining the leaf springs at their end portions;

means for connecting the suspension system to said axle;

longitudinally extending offsetting means mountable at about said means' central portion below and to said axle by said axle connecting means, said offsetting means retaining said leaf springs in mountable underlying relation to said axle;

said offsetting means having ends forward and aft of said central portion which terminate in support means for the lower portion of a pneumatic system;



said pneumatic system comprising a vertically flexible pneumatic chamber extending between each of said support means and a respective frame member when the system is mounted on said vehicle such that when pneumatic pressure is applied to the chambers they expand, forcing the wheel into engagement with the road surface and such that when the pressure is released, the normal upward bias of the leaf springs lifts the wheel out of road engagement;

the system being further characterized by said spring hanger means and said offsetting means being located in said system such that when the system is mounted on said vehicle, said leaf springs are located substantially directly under their respective longitudinally extending frame members.

3,877,719

INFLATOR-CONNECTOR FOR INFLATABLE VEHICLE SAFETY BELTS

Donald J. Lewis, Troy, and Richard W. Lucore, Rochester, both of N.Y., assignors to Allied Chemical Corporation, New York, N.Y.

Filed Nov. 24, 1972, Ser. No. 309,404

Int. Cl. B60r *21/08*

U.S. Cl. 280—150 AB **25 Claims**

1. A combination vehicle safety harness assembly and inflator-connector comprising:

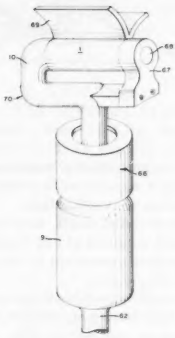
a. inflatable lap and shoulder belts having one end of both belts interconnected and terminating in a rigid unitary tubular coupling member constructed as a single rigid hollow unit having an inlet opening for the passage of gas, and an outlet connected to the interconnecting seat belts;

b. a rigid cooperating connecting member anchored to the vehicle, having conduit means therethrough, and adapted to accept the tubular coupling member in substantially gas-tight engagement, with the outlet of the conduit means in substantial alignment with the inlet opening of the coupling member, to permit the passage of gas from the connecting member to the coupling member when in engagement therewith;

c. a source of gas in communication with the inlet of the conduit;

d. said tubular coupling member being sized to slip within a portion of the outlet of said rigid connecting member, and having on its tubular structure a point of enlargement for locking engagement with cooperating biased latches in the anchored connecting member, whereby said coupling member may be pressed and locked into communication with said connecting member, and thereby with the source of gas;

e. disengaging means for manual disengagement of the tubular coupling member;



f. sensing means responsive to preselected conditions to initiate the flow of gas through the engaged connecting member and coupling member to simultaneously inflate the interconnecting inflatable belts; and

g. said coupling member having connected thereto a rigid structure spanning the belt in its folded condition while leaving sufficient clearance for passage of gas through said belt, said rigid structure having a graspable handle attached thereto to aid a user in guiding the coupling member for engagement with the anchored connecting member.

3,877,720

AIR-BAG SYSTEM

Horst Gradahrend Gent Upmeier, Leopoldshohe 3, and Ulrich Seiffert, Braunschweig, both of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Nov. 27, 1972, Ser. No. 309,881

Claims priority, application Germany, Nov. 27, 1971, 2158930

Int. Cl. B60r *21/08*

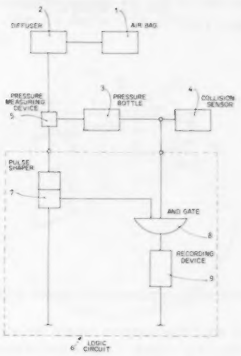
U.S. Cl. 280—150 AB **8 Claims**

1. Air bag safety apparatus, comprising, in combination:

a. gas delivery means for expanding an air bag;

b. sensor means connected to the gas delivery means for activating said gas delivery means to expand the bag in response to a sensed condition; and

c. logic means connected with said sensor means and said gas delivery means for providing one output indication in the event that inflation of the air bag is the result of an activation by said sensor means and for providing another



output indication in the event that inflation of the air bag is not the result of an activation by said sensor means.

3,877,721

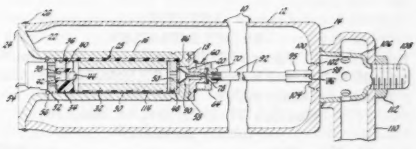
INFLATOR FOR OCCUPANT RESTRAINT CUSHION

Robert K. Brown, Jr., Sandusky, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed June 25, 1973, Ser. No. 373,281

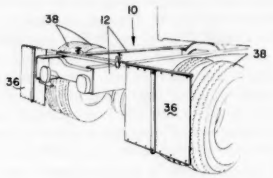
Int. Cl. B60r *21/08*

U.S. Cl. 280—150 AB **3 Claims**



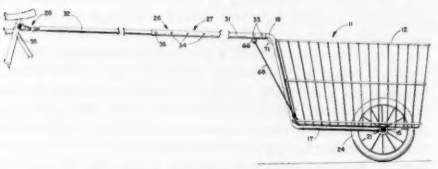
1. An inflator comprising, in combination, a pressure vessel containing pressure fluid and provided with a normally closed rupturable outlet controlling flow of the pressure fluid to an occupant restraint cushion, a combustion chamber within the pressure vessel and including an outlet open to the pressure vessel, a gas generating charge of propellant within the combustion chamber, pressure sensor means for sensing the pressure level in the pressure vessel and including a substantially closed chamber having an inlet wall provided with an aperture therein, pressure responsive means within the chamber and being subjected to the pressure of the pressure fluid through the inlet wall aperture, means mounting the pressure sensor means to the combustion chamber over the outlet thereof to normally close the outlet from the combustion chamber to the pressure vessel, a hollow annular impact member for impacting and rupturing the pressure vessel outlet, means mounting the impact member to the pressure sensor means and to the rupturable outlet with the member opening to the aperture of the inlet wall and to the pressure fluid for conducting pressure fluid to the aperture, and means for initiating the charge of propellant to generate high pressure gas and move the pressure sensor means from the outlet, the impact member impacting and rupturing the rupturable outlet upon movement of the pressure sensor means to open the pressure vessel outlet to the cushion.

3,877,722
MUD FLAP APPARATUS FOR TRUCKS
Harold V. Conner, 9339 E. Bartola Ave., Pico Rivera, Calif. 90660
Filed May 7, 1973, Ser. No. 358,140
Int. Cl. B62d 25/16
U.S. Cl. 280—154 3 Claims



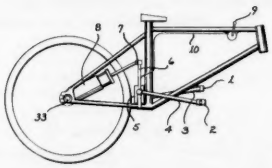
1. Flap mounting apparatus for trucks and the like comprising:
elongated mud flap support means for attachment to frame members of a vehicle chassis and transversely thereof;
means for attaching said support means to the frame members of the vehicle chassis;
a plurality of mud flaps;
means securing the upper end of each flap to the support means;
reinforcing bar means extending transversely along the lower edge of the flaps for holding the lower ends of said flaps extended;
rigid vertical bar means extending vertically along the center of the flap and having one end secured to the support means and the other end secured to the reinforcing bar means for preventing creeping of the mud flap;
the upper end of each vertical bar is pivotly attached to the support means.

3,877,723
BICYCLE TRAILER
Robert W. C. Fahey, 18568 Brookhurst, Fountain Valley, Calif. 92708, and Kenneth W. McKinzie, 2008 W. Camden, Santa Ana, Calif. 92704
Filed Oct. 29, 1973, Ser. No. 406,751
Int. Cl. B60d 1/14
U.S. Cl. 280—204 5 Claims



1. A bicycle trailer adapted to be towed behind a bicycle comprising;
a body, a frame, and a pair of wheels disposed under said body, to allow said body to be rolled along the ground;
said pair of wheels being mounted on opposite sides of said body and aft of the geometrical center thereof;
said frame including towbar means extending forward from the front end of said body, and a coupler for fixing said towbar means to said bicycle;
a first tube fixed transversely to the underside of said body;
a second tube fixed to said first tube and fixed to the underside of the body so that said second tube extends forward of said body;
said second tube is further disposed to be fixed to the front of said body and terminating near the top thereof;
said towbar means being coupled to said second tube;
said first tube being square in cross-section, with a flat side thereof adjacent and fixed to the underside of said body.

3,877,724
VARIABLE TORQUE DRIVE MECHANISM FOR BICYCLES
Zenas E. Chase, 7510 East 27 St., Tucson, Ariz. 85710
Filed Oct. 1, 1973, Ser. No. 402,098
Int. Cl. B62m 1/04
U.S. Cl. 280—241 3 Claims

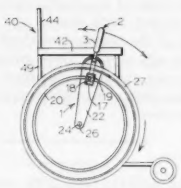


1. A variable torque driving mechanism for converting generally lateral foot movement to rotary movement, which mechanism comprises in combination:
a. first and second radial shafts, each separately including: (i) a foot pedal mounted at one shaft extremity, and (ii) an axle of rotation connected at the opposite extremity;
b. a variable torque arm;
c. slide means axially movable along said torque arm during operation of said driving mechanism for selecting various moment points on said torque arm;
d. transmission means for: (i) limiting the effective angle through which said first and said second radial shafts may rotate about their corresponding axles of rotation, (ii) translating movement of one of said foot pedals into an equal and oppositely directed movement of the other of said foot pedals, and (iii) oscillating said torque arm in direct response to the movement of said foot pedals;
e. chain and sprocket ratchet means including: (i) a free turning sprocket, (ii) a drive shaft, (iii) a drive sprocket connected to said drive shaft, (iv) a continuous chain for mechanically linking said sprockets, (v) first ratchet means for selectively engaging said drive chain in response to relative motion in a first direction, (vi) second ratchet means for selectively engaging said drive chain in response to relative motion in a second direction, said direction being generally opposite to said first direction, (vii) linkage means for connecting said first and said second ratchet means to said slide means; and
f. control means for positioning said slide means at various points along said torque arm.

3,877,725
WHEEL DRIVING APPARATUS
Herbert Barroza, 2293 Aupaka St., Pearl City, Hawaii 96782
Filed Mar. 26, 1973, Ser. No. 344,971
Int. Cl. B62m 1/16
U.S. Cl. 280—242 WC 9 Claims

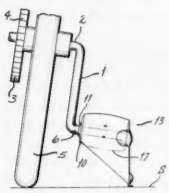
1. Wheel driving apparatus comprising a frame, an axle mounted on the frame, wheel means mounted on the axle for rotating with respect to the frame, a carrier mounted on the axle and extending along the wheel, a pin connected to the carrier opposite a peripheral portion of the wheel means, opposed inner and outer gripper means mounted on the pin for rotation thereon and positioned adjacent opposite portions of the wheel means, and a handle extending upward from the gripper means, whereby the gripper means may be rotated on

the pin into gripping contact with the wheel portions, and whereby further movement of the handle means pulls the



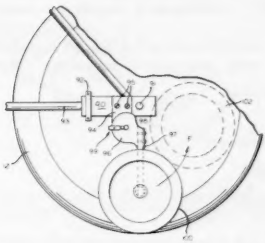
gripper means, wheel means, pin and carrier in a rotating movement about the axle.

3,877,726
BICYCLE SUPPORT STAND
Edwin E. Foster, 1801 Camp Craft Rd., Austin, Tex. 78767
Filed Feb. 26, 1973, Ser. No. 335,699
Int. Cl. B62h *1/08*
U.S. Cl. 280—294 **16 Claims**



1. In combination with a bicycle pedal for receiving a user's foot for cycling action having normally front and rearward bars having inner end portions proximate the related bicycle and outer end portions laterally outwardly of the related bicycle, inner and outer side plates connecting said front and rearward bars, there being a crank arm extending between said side plates in axial perpendicular relationship thereto to define a pivot axis for said pedal for rotation thereabout between operative, pedaling position wherein said pedal is in substantially horizontal disposition, and inoperative, resting position wherein said pedal is presented in substantially vertical disposition, a rigid support stand rigidly and non-foldably fixed on said pedal for rotation therewith about said axis of said crank arm and being located laterally outwardly with respect to the portion of said pedal receiving the user's foot, said support stand projecting laterally outwardly and downwardly of said outer side plate when said pedal is in inoperative, resting, substantially vertical position, and projecting laterally outwardly and endwise of said outer side plate beyond one of said front and rearward bars when said pedal is in operative, pedaling, substantially horizontal position, said support stand being asymmetrical with respect to said pedal when the latter is in substantially horizontal operating position, said stand being of such shape and weight that the center of gravity of the combined pedal and stand is offset from a vertical plane passing through said crank arm pivot axis so as to normally urge said pedal into inoperative, resting, substantially vertical position.

3,877,727
RETRACTABLE BICYCLE TRAINING WHEELS
Kenneth L. Johannsen, 1111 W. Cedar Ln., Arlington Heights, Ill. 60007
Continuation of Ser. No. 120,606, March 3, 1971, Pat. No. 3,746,367. This application July 16, 1973, Ser. No. 379,554
Int. Cl. B62h *1/10, 7/00*
U.S. Cl. 280—301 **4 Claims**



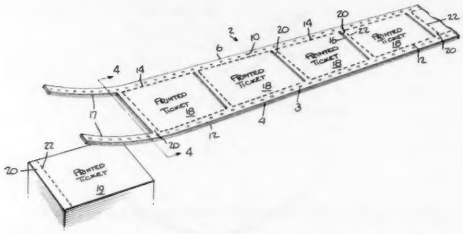
1. Auxilliary bicycle wheels comprising:
mounting means for mounting auxilliary wheel holding brackets on each side of the rear axle of the bicycle,
said mounting means comprising a first bracket attached to the axle of said bicycle,
a second bracket dependent therefrom,
said second bracket including a circular end thereon,
a third bracket with a somewhat circular endplate rotatably positioned over said circular end of said second bracket, said third bracket supporting an auxilliary bicycle wheel, the relative rotation between said second and third brackets moving said auxilliary wheel between a lowered, ground engaging position and a raised, retracted position, said somewhat circular endplate being set at an angle relative to the vertical position of said bicycle, whereby said auxilliary wheel is horizontally disposed from the rear wheel of said bicycle when in said lowered position, wheel axle means for connecting said auxilliary wheel to the third bracket so that the periphery of said auxillary wheel is parallel to the periphery of the rear wheel of said bicycle, when in the lowered position, and the periphery of said auxilliary wheel is angularly disposed away from the periphery of said rear wheel when in said retracted position,
latch means for latching said auxilliary wheel in either the lowered or the retracted position, said latch means comprising a spring loaded locking pin for releasably locking said circular end against rotation relative to said end plate in both said retracted and said lowered position,
said locking pin being movable relative to both said endplate and said circular end for extention through said end plate into holding contact with openings in said circular end when said auxilliary wheel is in either said lowered or said retracted position.

3,877,728
METHOD AND APPARATUS FOR HIGH SPEED TICKET PRINTING
Herbert Herz, Larchmont, N.Y., assignor to Vogue Instrument Corporation, Richmond Hill, N.Y.
Filed Jan. 30, 1973, Ser. No. 328,041
Int. Cl. B41l *1/20*
U.S. Cl. 282—11.5 **6 Claims**

1. A series of interconnected multi-page booklets produced from a continuous web of multi-copy forms which are adapted for use with a high speed printer, comprising:
a. a web of paper stock having a plurality of sheets of paper in thickness and having two opposing longitudinal edge portions and an inner portion;

b. said web having a row of sprocket holes along each longitudinal edge portion of said web, and lines of perforation extending longitudinally of said web and disposed along the inside of each row of sprocket holes;

c. said web having a series of pre-cut slits, said slits extending between said lines of perforation, with adjacent ones of said slits defining two opposing sides of a multi-page booklet within said web, said slits being disposed transversely to the longitudinal axis of said web and extending



across said inner portion of said web, said transverse slits and said lines of perforation permitting an individual booklet to be separated from the remaining web; and

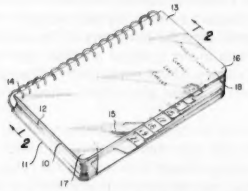
d. a glued binding stub along an edge of each of said pages of each booklet adapted to hold the multiple pages together after a booklet has been separated from said web, said binding stub extending transversely to the longitudinal axis of said web and adjacent to each of said transverse slits.

3,877,729

BOOK LEAF INDEXING ARRANGEMENT

Arthur S. Friedman, 509 Madison Ave., New York, N.Y. 10022

Filed Nov. 7, 1973, Ser. No. 413,697
Int. Cl. B42f *21/00*; B42d *3/00*
U.S. Cl. 283—42 **1 Claim**



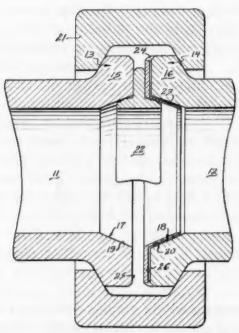
1. In combination: a book having front and back covers, separate groups of consecutive leaves therebetween, one side edge of the front cover having therein a longitudinal recess intermediate its top and bottom edges and constituting an index sight aperture, each group of leaves having in each leaf thereof an index sight aperture similar to and in registry with the front cover sight aperture, the length of the sight apertures common to each separate group of consecutive leaves being shorter than the length of the front cover sight aperture and being successively shorter from their upper to their lower ends, the first page face of the first leaf of each group of leaves having thereon indicia identifying that particular group and located in the area between the upper end edge of the sight aperture in the leaf on which it appears and the upper end edge of the sight aperture in the immediately preceding group of leaves, the marginal zone portions of all the book leaves and the front cover being identical in size and shape between the lower ends of their sight apertures and the bottom edge of the book, the lower ends of all said sight apertures being in flush registry at a height above the bottom edge of the book at least equal to the distance between the upper end edge of the front cover sight aperture and the upper end of the sight aperture in the first group of leaves beneath the front cover; and a rectangular sheet of transparent plastic material doubled upon itself in U-shape to provide a bight portion, said transparent sheet encasing the inner and outer faces of the front cover in such manner that said bight portion completely encases the entire index side edge of the front cover and overlies all the sight apertures of the book leaves and front cover with a double thickness of the transparent sheet extending from the top to the bottom edges of the front cover, thereby providing reinforcement for the marginal edge zone portions of the front cover between the ends of its sight aperture and the adjacent end edges of the cover.

3,877,730

METHOD OF REPAIRING A FLANGE FACE OF A CLAMPED-FLANGE SEALING-RING TYPE PIPE COUPLING

Charles E. Frantz, Richland, Wash., assignor to The United States of America as represented by the United States Atomic Energy Commission, Washington, D.C.

Filed Feb. 12, 1974, Ser. No. 441,772
Int. Cl. F16l *55/18*
U.S. Cl. 285—15 **4 Claims**



4. In a clamped-flange sealing-ring type pipe coupling wherein a sealing-ring is held in a conical seat in a hub of a flange on the end of each of the two pipes to be coupled, said sealing-ring engages a sealing-surface on said hub, and a seal is effected by drawing together with a clamp the flanges of the two pipes which are to be coupled, and wherein the sealing-surface on the hub of a flange has corroded, the improvement therein comprising: a flange liner mounted over the surface of said hub of said flange and lying between said corroded sealing-surface on said hub and said sealing-ring, said flange liner being preformed to a contour which duplicates the surface of the hub of said flange and sealingly joined to said flange by a weld about the periphery thereof.

3,877,731

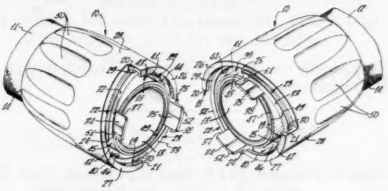
COUPLING

Robert A. Kraus, 14160 Redhill Blvd., Apt 39, Tustin, Calif. 92680, and Edmund J. Kraus, 2601 Orion, No. 4, Santa Ana, Calif. 92704

Filed Sept. 14, 1973, Ser. No. 397,428
Int. Cl. F16l *35/00*
U.S. Cl. 285—82 **42 Claims**

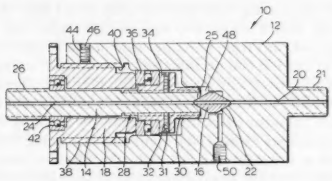
1. A coupling device comprising

a duality of integral tubular members,
each of said members including an end portion having
a first outside thread extending partway therearound from an entrance thereto to an inner end thereof,
a second inside thread extending partway therearound from an entrance thereto at at a different location from said entrance to said first outside thread to an inner end thereof at a different location from said inner end of said first outside thread such that when said end portions of said members are brought into engagement and relatively rotated said first thread of



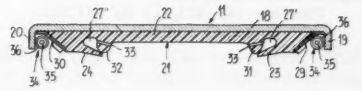
each of said members meshes with said second thread of the other of said members so that said members assume a mated position,
at least one of said first and second threads of each of said members having a shoulder adjacent the entrance thereto,
said shoulders of said members being opposite from each other and in adjacency when said members so assume said mated position,
and sealing means,
said sealing means being in interengagement when said members are in said mated position.

3,877,732
HIGH PRESSURE ROTARY COUPLING
Udo H. Mohaupt, Galt, Ontario, Canada, assignor to The University of Waterloo, Waterloo, Ontario, Canada
Filed Sept. 28, 1972, Ser. No. 294,994
Int. Cl. F16l *21/04*
U.S. Cl. 285—94 **13 Claims**



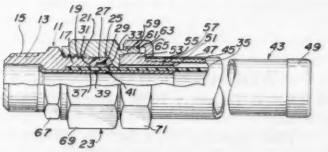
13. In a swivel coupling for high-pressure fluid, a lubricated joint between a solid first member and a solid second member, comprising:
a recess in the first member which converges away from the second member, is radially symmetrical, and communicates with a first passageway in the first member,
means mounting the second member for rotation about the axis of symmetry of said recess,
a portion of said second member being complementary and parallel with said recess, symmetrical about said axis, and in surface-to-surface engagement with said recess,
a second passageway in said second member communicating with said first passageway, means for adjusting the axial position of said second member with respect to said first member, and for restraining mutual axial movement once said axial position is adjusted, in order to permit a continuous and controlled escape of said fluid across said recess to lubricate the recess and to cause the pressure drop between said passageways and said location to occur across the recess to minimize the axial separative thrust between said members and means for continuously removing fluid escaping across the seating recesses, said means for removing fluid being located in said first body member and extending to the exterior thereof along a line that is not parallel to the length of said passageways.

3,877,733
PIPE COUPLING
Immanuel Straub, c/o Straub Federnfabrik, 7323 Wangs, Switzerland
Filed June 10, 1974, Ser. No. 478,174
Claims priority, application Switzerland, June 15, 1973, 8644/73
Int. Cl. F16l *17/00*
U.S. Cl. 285—105 **8 Claims**



1. A pipe coupling for coupling together the pipe ends of pipes, comprising a clampable housing capable of being clamped about the pipe ends intended to be interconnected, a sealing gasket enclosed in said housing and possessing a substantially C-shaped cross-section with end edges constructed as sealing lips and intended to sealingly bear against a respective one of the pipe ends, said sealing gasket having a web, each sealing lip having a lip root and being supported at the web of the sealing gasket by means of an associated substantially ring-shaped bead arranged at the web in axial spacing from the associated lip root, each sealing lip possessing a substantially tapered configuration decreasing in thickness and extending towards a free end of minimum thickness remote from its lip root, the associated substantially ring-shaped bead only bearing against said free end of minimum thickness of said sealing lip during such time as the clampable housing is not yet clamped, and wherein said sealing gasket is provided with spaces to each side of the ring-shaped bead which are connected with one another by throughpassages.

3,877,734
ADAPTER FOR CONNECTING SPIRALLY FORMED TUBING TO ANOTHER CONDUIT
Chester W. Brozek, Chicago, Ill., assignor to Chicago Fittings Corporation, Broadview, Ill.
Filed May 3, 1974, Ser. No. 466,676
Int. Cl. F16l *33/00*
U.S. Cl. 285—249 **6 Claims**



1. An adapter for connecting a flexible gas conveying line having a spirally formed tubular shield to a gas meter comprising:
a nipple having threads for engagement with the gas meter;
a compression flange extending from the side of said nipple away from the gas meter and having threads on the external surface thereof;

a compression nut having threads to mate with the threads on said compression flange;

a compression member forced into engagement with the flexible gas conveying line upon mating of the threads of said compression flange and said compression nut;

a threaded connecting flange extending from the side of said compression nut away from said compression flange;

a connecting nut having threads to mate with the threads of said connecting flange; and

a linking member forcibly restrained upon mating of the threads of said connecting flange and said connecting nut, said linking member having threads formed thereon to engage the spirals of the tubing.

3,877,735

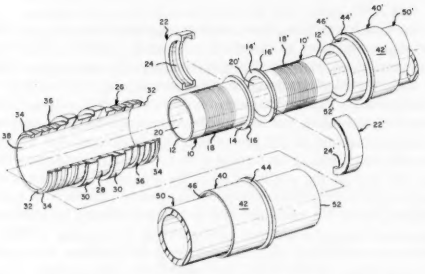
METHOD AND DEVICE FOR JOINING PLASTIC PIPE

Henry William Demler, Sr., Lebanon, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Apr. 16, 1973, Ser. No. 351,742

Int. Cl. F16l *13/14*

U.S. Cl. 285—382.1 **6 Claims**



1. A coupling device useful for joining two plastic pipes arranged end to end, comprising:

a. insert means for snug insertion into the ends of said plastic pipes, said means each having a flange on one end thereof;

b. retaining means adapted to grip and retain said flanges in abutting relation with each other whereby said plastic pipes are joined one to the other;

c. cylindrical coupling means for positioning about the joined plastic pipes and axially spanning the ends thereof, said coupling means being in overlying relation to the insert means; and

d. a pair of rings having a smaller inner diameter than the outer diameter of the cylindrical coupling means, said rings adapted for being fitted around the coupling means thereby pressing and retaining the plastic pipes between the coupling means and the insert means.

3,877,736

WHIP FINISHING IMPLEMENT

Fredrick Thomas Zauskey, 2090 Lampman Rd., Gold Hill, Oreg. 97525

Filed Sept. 20, 1973, Ser. No. 399,133

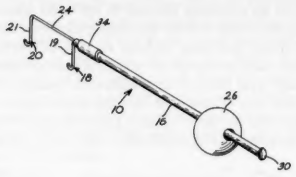
Int. Cl. D03j *3/00*

U.S. Cl. 289—17 **4 Claims**

1. A whip knot finishing implement, for use with any fixed fly tying vise or clamp, comprising, in combination,

a. a straight rod,

b. a pair of rigid, adequately spaced, essentially identical and parallel hook members, both unitary with the rod and radially offset from the rod at one end thereof in fixed relation to one another, both of which hook members have their open mouth portions disposed in planes perpendicular to the rod, and unavoidably faced toward the axis of the rod at all times, and



c. a handle member surrounding said rod in freely rotatable relation thereto.

3,877,737

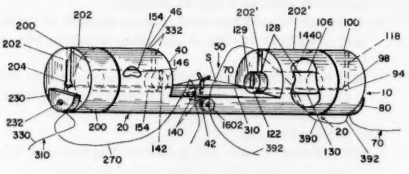
FISHING KNOT TYER

Glenn D. Chappell, 342 S. State St., Elkhorn, Nebr. 68022

Filed July 5, 1974, Ser. No. 485,900

Int. Cl. D03j *3/00*

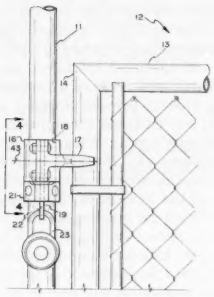
U.S. Cl. 289—17 **4 Claims**



1. A fishing knot tyer **10** capable of tying a true blood knot comprising a main body **20** having right and left spaced body end portions **44, 46** and having a connecting body portion **42** connecting the end portions, said main body having a body notch **40** therein on its upper side above said connecting portion and separating said end portions, said body end portions having right and left knob extension receiving passages **106, 154** extending therethrough respectively from right to left and in communication with said notch, said main body portion (**20**) having right and left body slots (**202', 332**) each extending into a respective one of said right and left end portions (**44, 46**) from an upper side of the respective one of said right and left end portions and extending from right to left through said body end portions (**44, 46**), and alignable with and placeable in communication with said right and left knob extension passages (**016,154**) respectively all along the length of said passages (**106, 154**), right and left knobs (**100, 200**) disposed at the right and left ends of said main body portion (**20**), right and left knob extensions (**128, 146**) attached respectively and having inner ends projecting inwardly beyond inner ends of said main body end portions (**44, 46**) respectively, said knob extensions (**128, 146**) having inner terminal ends spaced apart by a portion of said body notch (**40**), said knob extensions (**128, 146**) having extension slots (**122, 142**) extending into each extension (**128, 146**) respectively and extending along each extension respectively from its knob end to its inner terminal end, said knobs each having a knob-slot (**118, 202**) extending therethrough from right to left and entering from the top thereof, said extension slots and said knob slots of each knob and its attached extension respectively being in alignment with each other and also being alignable with a respective one of said body slots (**202', 332**) whereby a fishing line can be passed downwardly through either of said knob slots and also downwardly through a respective adjacent body slot and knob-extension slot so that a line can extend directly through either of said knobs and through its extension slot and out the terminal end of its extension, and a retainer (**140**) attached to said main body portion and disposed in a position such that a line passing from the extension slot of one of said extensions to the extension slot

of the other of said extensions can be engaged with said retainer and will be prevented by said retainer from moving out of engagement with said retainer during rotation of said knobs when ends of said line are fixed in said body end portions respectively, right and left line holding means (80, 230) mounted on and rotating with said knobs and adapted to receive and hold ends of lines which extend beyond outer ends of said knob slots.

3,877,738
HANDLE-LATCH
Robert L. Nelson, 756 Orion Ln., Foster City, Calif. 94404
Filed Sept. 14, 1973, Ser. No. 397,353
Int. Cl. E05c *5/00*
U.S. Cl. 292—68 **7 Claims**



1. A gate handle latch for mounting on a gatepost which defines one edge of a gateway having a hinged gate disposed therein which is adapted to swing between an open and closed position relative to the gateway wherein the gate has one edge disposed in juxtaposition with the gatepost when in the closed position comprising

means for engaging the one edge of the gate, said means having an opening adapted to surround the gatepost, so that said means for engaging may slide vertically therealong and rotate thereon,

a bolt member attached to one side of said means for engaging,

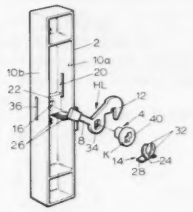
a bolt receiver adapted for fixed mounting on the gatepost below said means for engaging and having a channel therethrough for receiving said bolt member,

said means for engaging having a recess therein spaced from where said bolt member is attached for accepting the one edge of the gate as it approaches the closed position,

said means for engaging also having a horizontal plane of symmetry passing therethrough, whereby said one side thereof may by positioned on a preferred access side of the gatepost, and said bolt member is adapted to be positioned in a downwardly extending direction to engage said bolt receiver on said preferred access side of the gatepost

said recess having a bottom surface proximate to said opening, said bottom surface including a web extending from side to side in said recess, whereby when said gate is erected and said web is removed to just clear the one edge of the gate when the gate is closed, and said engaging means is lowered, said bolt member passes through said channel fixing the gate in the closed position, and the one edge of the gate is proximate to the gatepost providing a minimal opening therebetween.

3,877,739
DOOR LATCH
William Cowen, Caledon East, Ontario, Canada, assignor to Ram Partitions Limited, Weston, Ontario, Canada
Filed Feb. 22, 1974, Ser. No. 444,720
Int. Cl. E05c *19/10*
U.S. Cl. 292—101 **13 Claims**



1. In a door latch, a monolithic box-frame mountable on a stile of a door and, having narrow elongated walls confronting each other;

a thin tongue integral with one of said walls projecting outwardly from an intermediate area and extending longitudinally thereof;

a slot in said one wall in spaced longitudinal alignment with said tongue;

a hub within said box-frame;

a web joining said confronting walls at one side of said box-frame providing a hub seat on which said hub is rotatable about an axis perpendicular to said web;

means for clamping said hub against said web to retain it in said seat;

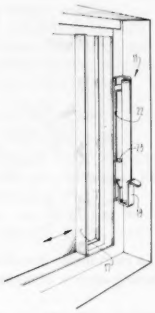
a hook radially attached to said hub and swingable by and upon rotation of the latter between an operative position in which it extends through the slot aforesaid for engagement with a co-operating keeper and an inoperative position in which it is disengaged from said keeper and virtually completely retracted within said box-frame; and

a lever radially attached to said hub and extending therefrom through a slot in the other of said confronting walls in which said lever is movable to rotate said hub to procure swinging of said hook between its operative and inoperative positions as aforesaid.

3,877,740
TUBULAR DEADLOCK FOR SECURING WINDOWS AND DOORS CLOSED
Bernard J. Carvell, Belvedere; W. Nelson Sandford, and Robert C. Ryan, both of Santa Clara, all of Calif., assignors to C. Michael Zimmerman, Palo Alto, Calif., a part interest
Filed Aug. 29, 1972, Ser. No. 284,490
Int. Cl. E05c *3/26*
U.S. Cl. 292—216 **12 Claims**

1. A deadlock for securing an opening closure, such as a window or door, in its closed position within a frame defining the opening to be closed comprising a generally cylindrical, movement blocking member having a reentrant portion defining a blocking edge and rotatable on a circular cylindrical path; carrying means adapted for rigid mounting adjacent an edge of one of said opening closure and said frame for supporting said rotatable blocking member oriented with the axis of rotation of said blocking member generally parallel to an edge of the other one of said closure and said frame and at a location at which when said closure is in its closed position, said circular cylindrical path of said blocking member is intersected by said edge of the other one of said closure and said frame, said carrying means limiting motion of said blocking member to said cylindrical path between an extended position in which said blocking edge of said blocking member blocks opening movement of said closure when it is in said closed

position and a retracted position at which said blocking member is free of the opening movement of said closure; releasable means for retaining said blocking member in said extended position with its blocking edge blocking opening movement of said closure; and wherein each of said movement blocking member and said carrying means has a circular cylindrical



section surface which coacts and mates with the circular cylindrical section surface of the other to define said cylindrical path, said carrying means having a reentrant portion adjacent said cylindrical section surface for accepting said edge of the other one of said closure and said frame to enable intersection of said path by said edge of said other one of said closure and said frame when said closure is in said closed position.

3,877,741

BUMPER FOR MOTOR VEHICLES, ESPECIALLY PASSENGER MOTOR VEHICLES

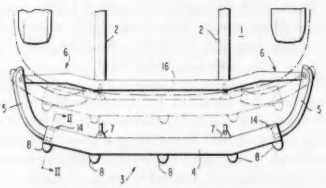
Karl Wilfert, Gerlingen-Waldstadt, and Rudolf Andres, Sindelfingen, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Germany

Filed Oct. 6, 1972, Ser. No. 295,487

Claims priority, application Germany, Oct. 9, 1971, 2150444

Int. Cl. B60r *19/06*

U.S. Cl. 293—89 **31 Claims**



29. A bumper arrangement for motor vehicles, the arrangement comprising: a rigid central member, means for yieldably supporting said central member on the vehicle, movably mounted side members adjoining the respective ends of said central member, and guide means provided on said central member at least at the respective ends thereof for guiding the movement of said side members, said guide means including at least a pair of spaced box-shaped elements provided on said central member, and means for interconnecting said spaced box-shaped elements to define said guide means.

3,877,742

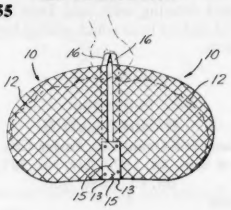
LEAF CASKET

Clarence W. Hatfield, Rt. 2, Box 2528T, Auburn, Calif. 95603

Filed June 5, 1973, Ser. No. 367,171

Int. Cl. B65d *13/00*

U.S. Cl. 294—55 **1 Claim**



1. In a leaf casket, a pair of similar members each including a band forming an open rim, netting secured to said band, said netting being formed into a container with the band delineating one open side of the container, a strip secured along the open side of the container, said strip having a plurality of teeth formed therealong with the teeth of each of the leaf caskets being adapted to interfit with those of a companion leaf casket, said teeth being blunt to prevent clogging, a handle integrally formed on the leaf casket at the upper central portion of the band, said handle having a lug formed on one side thereof and a companion socket formed adjacent thereto, and whereby when the handles are brought into contacting relation the lug on one of the handles fits into the socket of the other handle, there being an opening formed in the netting adjacent the handles to permit the fingers of the user to extend around the handle, said handles being tilted slightly out the plane of the bands toward the open side of the caskets so that hand pressure around the handle will tend to lock the caskets together, and said netting tapering inwardly slightly from the open side to permit the casket to be nested for storage.

3,877,743

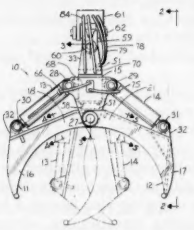
FLUID OPERATED GRAPPLE

Norman Allen Johnson, 5325 Tenth Ave., South Delta, British Columbia, Canada

Filed June 25, 1973, Ser. No. 372,973

Int. Cl. B66c *3/16*

U.S. Cl. 294—88 **5 Claims**



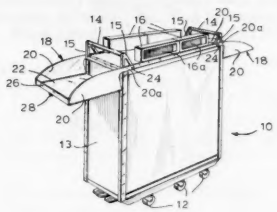
1. A fluid operated grapple assembly comprising a swivel head means having a spindle means rotatably mounted in a housing means, said spindle means secured axially in said housing by upper and lower thrust bearing means, said upper and lower thrust bearing means operatively mounted respectively in upper and lower bearing chambers, said upper and lower thrust bearing means including respectively upper and lower anti-friction bearing assemblies having inner and outer races, said outer races operatively mounted in said housing means outboard a pair of housing shoulder means, said inner races operatively mounted on said spindle means inboard a pair of spindle shoulder means, one of said spindle shoulder

means axially adjustable on said spindle means, a pair of jaws each having upper and lower end-portions, said upper end-portions pivotally connected to said housing means, a pair of fluid operated linear actuators each having an extension and a retraction fluid port and being pivotally connected at one end to said housing and at the other end to one of said jaws intermediate said upper and lower end-portions, each of said extension fluid ports duct-connected to one of said bearing chambers and each of said retraction fluid ports duct-connected to the other of said bearing chambers, one of said bearing chambers duct-connected through said spindle means to a controlled grapple-closing fluid source and the other of said bearing chambers duct-connected through said spindle means to a controlled grapple-opening fluid source, extension of said pair of linear actuators closing and retraction thereof opening said grapple assembly.

3,877,744
SERVING CART

Matthew N. Miller, Woodland Hills, Calif., assignor to Fairchild Industries, Inc., Germantown, Md.

Filed Oct. 12, 1973, Ser. No. 405,804
Int. Cl. B60p *3/02*
U.S. Cl. 296—22 **9 Claims**

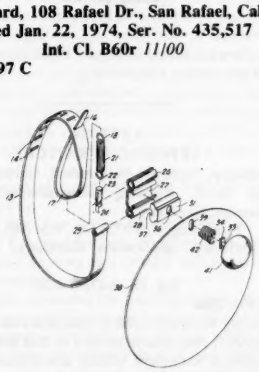


1. A serving cart for carrying and dispensing provisions to passengers in a vehicle comprising a serving cart body, a handle connected to the upper portion of one end of said cart body, and a cover pivotally connected to the upper portion of the same end of said cart body and adapted to be positioned over at least a portion of said cart body, said cover having means for forming a shelf when in its open position and having means for allowing access to said handle when the cover is in both its open and closed positions.

3,877,745
SUN SHIELD

George K. Girard, 108 Rafael Dr., San Rafael, Calif. 94901

Filed Jan. 22, 1974, Ser. No. 435,517
Int. Cl. B60r *11/00*
U.S. Cl. 296—97 C **6 Claims**

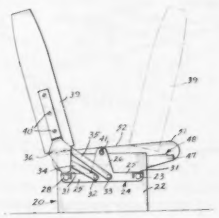


1. A sun shield for an automobile visor comprising a support channel, a pair of slotted tubes on and extending along opposite outer sides of said channel, means for mounting said channel on said visor including a band largely encircling said visor and shaped fasteners at the ends of said band and each fitting within and slidable along the slot in a respective one of said tubes, a button slidable in said channel, a shield plate, and means for mounting said shield plate on said button for rotation with respect to said channel.

3,877,746
REVERSIBLE SEAT

William C. Christine, Catasaque, and William E. R. Watt, Barto, both of Pa., assignors to General Seating and Sash Company, Inc., Topton, Pa.

Filed Dec. 4, 1973, Ser. No. 420,906
Int. Cl. B60n *1/02*
U.S. Cl. 297—95 **2 Claims**



1. In a reversible walkover seat, support members, a body member having projecting end portions and an intermediate triangular shaped upstanding portion, a bar spaced from said body member, a pair of spaced parallel horizontally disposed rods extending between said body member and bar and secured thereto, a pair of spaced horizontally disposed shafts extending through said bar and body member, a pair of generally parallel movable links having their lower ends connected to the ends of said shaft, a bracket pivotally connected to the upper ends of said links, a back rest affixed to the upper portion of said bracket, a stub shaft connected to the upper portion of the triangular section of the body member, a crank movably connected to said stub shaft, said crank including portions that are arranged angularly with respect to each other, a pin connected to said crank, a rocker base having frame pieces at least one of which is provided with a vertically disposed slot for receiving said pin, said rocker base having camming surfaces thereon, curved guide elements affixed to the upper surfaces of said rods, and said guide elements having upstanding flanges associated therewith, horizontally disposed stop elements mounted on end portions of said rods, said bracket having a shoulder on its lower end for selectively engaging and contacting said stop elements, the frame pieces of the base having intermediate lower straight sections and inclined end edge portions, and a seat cushion on said rocker base and said seat cushion having a top surface that assumes a proper inclined position relative to the direction of travel of a member in which it is mounted.

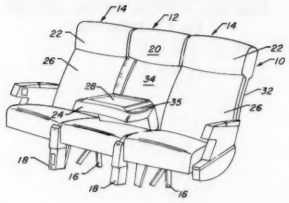
3,877,747
CENTER SEAT FORWARD FOLDING COCKTAIL TABLE FOR MULTI-PASSENGER RECLINING SEAT UNIT

Edward J. Brennan, Litchfield, and Rene J. Brunelle, Wolcott, both of Conn., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed Jan. 7, 1974, Ser. No. 430,952
Int. Cl. A47f *7/70;* **B64d** *11/06*
U.S. Cl. 297—124 **9 Claims**

1. In a multi-passenger reclining seat unit having a base supporting at least three seat cushions and means on the base for pivotally mounting at least three individually adjustable reclining seat back members, each of said seat back members

having a cushioned headrest portion affixed thereto, the improvement comprising a back support cushion for an intermediate seat mounted for movement relative to said base, either with, or relative to the seat back member for said intermediate seat, said back support cushion having an upper and lower portion, said upper portion being mounted to said lower portion for pivotal movement relative thereto and said lower portion being mounted on a frame for pivotal movement relative to said base said back support cushion being pivotable between a generally vertical seating use position in contact with its seat back member and a generally horizontal non-seating use position forward and away from the seat back



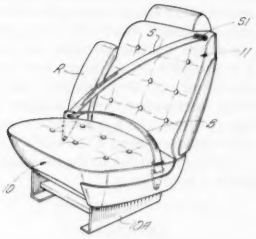
wherein the upper portion of said back support cushion is positioned spaced immediately above and in generally parallel relationship with its associated seat bottom cushion and the lower portion of said back support cushion is at an angle relative to said upper portion, a table surface being affixed to the rear surface of said upper portion of said back support cushion for said intermediate seat, said table surface being adapted to be hidden from view and in contact with its associated seat back member in its storage position when said seat back cushion is in its seating use position, said table surface being useable as a table by occupants of adjacent seats in said seat unit when said seat back support cushion is in a forward non-seating use position.

3,877,748

VEHICLE SAFETY SEAT

Walter S. Eggert, Huntingdon Valley, Pa., assignor to The Budd Company, Troy, Mich.

Filed Feb. 4, 1974, Ser. No. 438,984
Int. Cl. A62b *35/00*
U.S. Cl. 297—216 **9 Claims**



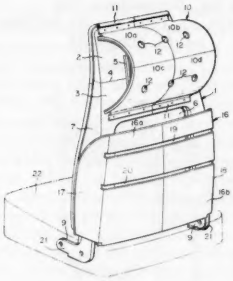
1. A vehicle safety seat comprising in combination, a seat base, a seat back, pin hinge means providing normal forward tilting movement of the seat back on the seat base, and a latch for holding the back in its rearward use position, said hinge means including a hinge pin adapted to yield under crash conditions, and adjacent supplemental hinge means at the hinge location which engages to hold the parts closely in hinging position, independently of the pin hinge means, and take the crash loading after the hinge pin has yielded by a predetermined amount, said supplemental hinge means including a curved projection on the seat back and a coacting member on the seat base to take hinge loads as applied by the seat back when having an occupant strapped therein under crash conditions.

3,877,749

REAR SEAT PASSENGER-PROTECTING SEAT BACK STRUCTURE FOR AUTOMOTIVE VEHICLE

Katsuo Sakurai, and Takeshi Yamawaki, both of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota-shi, Aichi-ken, Japan

Filed Apr. 23, 1973, Ser. No. 353,702
Claims priority, application Japan, July 20, 1972, 47-72697
Int. Cl. B60r *21/02*
U.S. Cl. 297—216 **8 Claims**



1. A rear seat passenger-protecting seat back structure for an automotive vehicle comprising:

a main frame board of a front seat back positioned on lower supporting arms with an opening portion in the lower part of said main board,

an upper buffer body having a semicircular shape which is integrally secured to and disposed on an upper part of said main frame board so as to swell out from the rear surface of said main frame board, and

a lower buffer board which is spaced from said main frame board and secured only to said lower supporting arms by bolts, said lower buffer board being positioned adjacent the rear of said opening portion at a lower part of said main frame board, the various constituent members being constructed so that they can undergo plastic deformations when subjected to impact loads exceeding predetermined set values, respectively.

3,877,750

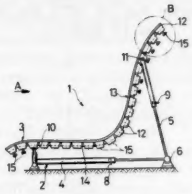
REPOSING FURNITURE

Werner Scholpp, Stuttgart-Weilimdorf, Germany, assignor to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Stuttgart-Zuffenhausen, Germany

Filed Aug. 6, 1973, Ser. No. 385,703
Claims priority, application Germany, Aug. 5, 1972, 2238675
Int. Cl. A47c *1/033*
U.S. Cl. 297—284 **30 Claims**

1. A resting furniture which comprises an adjustable unit and a support frame, characterized in that the adjustable unit includes several members which are connected with each other by way of joint means and support means, and in that the members are held in position at the support means by fixing means, and in that the joint means are provided at the longitu-

dinal edges of the unit whereas the support means extend substantially in the center longitudinal plane of the unit, said



members being spaced apart from adjacent members at center portions thereof.

3,877,751

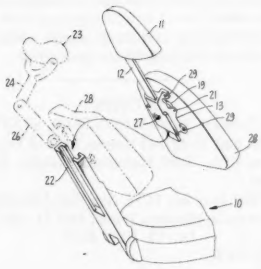
SPLIT BACK DENTAL CHAIR APPARATUS

Keith O. Rasmussen, San Francisco, Calif., assignor to Hek Manufacturing Company, Inc., San Francisco, Calif.

Filed July 30, 1973, Ser. No. 384,013

Int. Cl. A47c *7/36, 7/42*

U.S. Cl. 297—410 **2 Claims**



1. A thin profile split back conversion for a dental chair having a frame including a tiltable back support member formed with a keyway for slidably supporting a backrest and an articulated headrest, said conversion comprising

a bracket formed for slidable mounting in the keyway of the back support member and having a second keyway formed therein;

means for adjustably securing said bracket in said first named keyway;

a thin profile backrest secured to said bracket;

a thin profile headrest having an elongated tongue slidable in said second keyway and formed with a series of ratchet teeth therealong;

a pawl pivotally mounted on said bracket medially thereof in underlying relation to said backrest and formed for selective engagement with said ratchet teeth;

spring means urging said pawl against said teeth; and

a handle secured to said pawl and extending laterally from said bracket for selective manual engagement and manipulation to disengage said pawl.

3,877,752

PLOUGH FOR USE IN MINERAL MINING

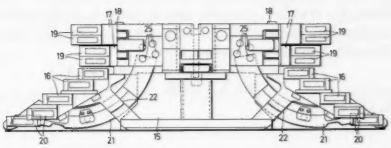
Alois Hauschopp, Werne; Bernd Steinkuhl, Altlunen, and Oswald Breuer, Dortmund-Husen, all of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Wethmar near Lunen, Westfalia, Germany

Filed Oct. 15, 1973, Ser. No. 406,427

Claims priority, application Germany, Oct. 14, 1972, 2250535

Int. Cl. E21c *27/44*

U.S. Cl. 299—34 **7 Claims**



1. A coal plough comprising:

a. an articulated multi-section sword plate;

b. a main body supported by a central section of the sword plate;

c. sets of cutting tools disposed near the ends of the main body;

d. guide members of arcuate shape;

e. guideways in the main body receiving the guide members for slidable movement along curved guide paths extending inwardly of the cutting tools relative to the main body;

f. floor-level cutters carried by the guide members, said floor-level cutters being capable of adopting various operating positions depending on the movement of the guide members along said guide paths; and

g. means for engaging the guide members to define a range of permitted movement along said guide paths for said members whereby to set the operating positions of the floor-level cutters.

3,877,753

METHOD AND MEANS OF TREATING SYNTHETIC FIBERS OF BRUSHES

Max Aronowicz Ripstein, Cuauhtemoc 60-304, Mexico, D.F., Mexico

Filed Nov. 6, 1973, Ser. No. 413,337

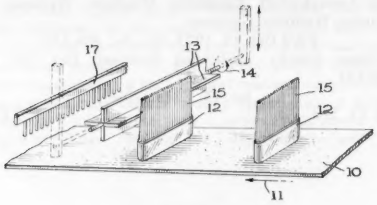
Int. Cl. A46d *1/05*

U.S. Cl. 300—21 **5 Claims**

1. A method of treating bristles of brushes comprising the steps of

moving the brushes against a crossbar with the crossbar contacting the bristles approximately one-third of the

distance from their free ends, and
rotating the crossbar with a beating action against said



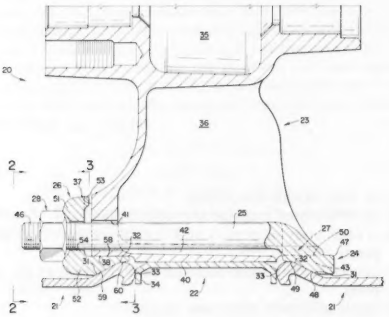
bristles at a speed of 700 to 2440 RPS to cause a whipping action and exploding of the end portions of said bristles.

3,877,754

DUAL RIM AND WHEEL ASSEMBLY

William D. Walther, Dayton, and Robert A. DeRegnaucourt, Centerville, both of Ohio, assignors to The Dayton Steel Foundry Company, Dayton, Ohio

Filed May 11, 1972, Ser. No. 252,412
Int. Cl. B60b *23/10*
U.S. Cl. 301—13 SM **2 Claims**



1. A dual rim and wheel assembly comprising, a wheel (**23**), a rigid spacer (**22**), a series of axially inner clamp means (**24**) and a series of axially outer clamp lugs (**26**) to cooperatively engage mounting surfaces (**31, 32**) on the flanges of inner and outer rims (**21**),

said clamp means (**24**) each being a one-piece solid element having a support bolt (**25**) joined to a wedge portion (**47**) with a radially outer face having a conical surface (**48**) for mating engagement with a correspondingly inclined inner rim flange mounting surface (**31**) and an intersecting axially oriented surface (**49**) for mating engagement with an inner rim flange seating surface (**32**),

said support bolt (**25**) extending axially through said wheel and a clamp lug (**26**) and carrying fastening means (**28**) attached axially outwardly of the wheel and said clamp lug,

said clamp lugs (**26**) each having intersecting surfaces (**60, 59**) thereon for engaging an axially inner surface (**31**) and a radially inner surface (**32**) on the flange of the outer rim,

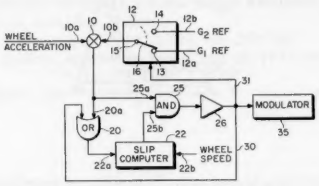
the clamp means and clamp lugs being drawn axially together to seat the rim flanges against said spacer by the tightening of said fastening means on said support bolts.

3,877,755

LATCHING GATE FOR ADAPTIVE BRAKING SYSTEM

Ralph W. Carp, Baltimore; Frederick O. Miesterfeld, Joppa, both of Md., and George B. Hickner, Niles, Mich., assignors to The Bendix Corporation, Baltimore, Md.

Continuation of Ser. No. 72,474, Sept. 15, 1970, abandoned. This application July 14, 1972, Ser. No. 289,044
Int. Cl. B60t *8/12*
U.S. Cl. 303—21 P **4 Claims**



1. In a wheeled vehicle having a wheel braking system whereby said vehicle wheels are braked by a braking force, an adaptive braking system control channel comprising:

means for generating a first electrical signal correlated to the speed of at least one vehicle wheel;

means for generating a second electrical signal correlated to the acceleration of at least one vehicle wheel;

means for generating a reference electrical signal level corresponding to negative acceleration of a vehicle wheel;

means for generating a third electrical signal while said second signal exceeds said reference level;

means triggered by said third signal and responsive to subsequent changes in said first and second signals for generating an output signal;

means responsive to an error signal for reducing said braking force; and,

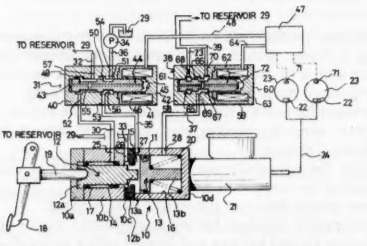
means for generating said error signal while said output signal and said third signal are generated.

3,877,756

ANTI-SKID BRAKE CONTROL SYSTEM

Masami Inada, and Toshiyuki Kondo, both of Toyoake, Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Aichi pref., Japan

Filed July 26, 1973, Ser. No. 382,949
Claims priority, application Japan, July 31, 1972, 47-76740
Int. Cl. B60t *8/10*
U.S. Cl. 303—21 F **5 Claims**



1. An anti-skid brake control system comprising:

wheel means including wheel brake cylinders;

a master cylinder hydraulically connected to said wheel brake cylinders;

manually operable means operably connected to said master cylinder;

a booster interposed between said manually operatable means and said master cylinder including a housing and

piston means slidably disposed therewithin and defining first and second chambers therein for increasing the brake pressure in said master cylinder in accordance with the pressure difference between said first and second chambers;

hydraulic pressure source means for supplying pressure to said first chamber of said booster;

a reservoir hydraulically connected to said pressure source;

computer means for generating first and second signals therefrom in response to predetermined wheel rotational conditions; and

first and second electro-magnetic valve means electrically connected to said computer means;

wherein said first electro-magnetic valve means is hydraulically interposed between said first chamber of said booster and said hydraulic pressure source so as to reduce the hydraulic pressure within said first chamber of said booster upon reception of said first signal from said computer means thereby decreasing the brake pressure in said master cylinder, and said second electro-magnetic means is hydraulically interposed independently of said pressure source between said second chamber of said booster and said reservoir so as to gradually decrease the hydraulic pressure within said second chamber of said booster upon reception of said second signal from said computer means at a predetermined time after said first signal has been terminated thereby gradually increasing the decreased brake pressure in said master cylinder.

3,877,757

METHOD OF AND INSTALLATION FOR BRAKING SO AS TO PREVENT THE WHEELS FROM SKIDDING

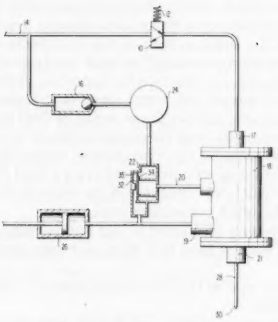
Giancarlo Michellone, Cambiano, and Mario Palazzetti, Turin, both of Italy, assignors to FIAT Societa per Azioni, Turin, Italy

Continuation-in-part of Ser. No. 110,232, Jan. 27, 1971, abandoned. This application June 27, 1973, Ser. No. 374,164

Claims priority, application Italy, Feb. 3, 1970, 67328/70

Int. Cl. B60t *8/12*

U.S. Cl. 303—21 F **3 Claims**



1. An anti-skid braking apparatus for vehicles comprising fluid operated brake means, supply means for supplying delivery pressure to said brake means, conduit means connecting said supply means and said brake means, solenoid operated valve means responsive to the dynamic state of at least one vehicle wheel disposed in said conduit means for controling the application of said delivery pressure to said brake means, rapid discharge pressure reducing valve means disposed in said conduit means intermediate said solenoid operated valve means and said brake means, storage means operatively connected to said conduit means intermediate said rapid discharge pressure reducing valve means and said brake means, said storage means comprising a container means and the storage control valve means, said rapid discharge pressure reducing valve means having control means for controlling the reduction ratio of the valve, additional conduit means connecting said storage control valve means to said control means whereby fluid under pressure may be supplied through said solenoid operated valve means in its open condition, through said rapid discharge reducing valve means to said brake means and to said container means through said storage control valve means, said fluid in said brake means being discharged through said rapid discharge reducing valve means and said fluid in said container means being applied to said control means upon closing of said solenoid operated valve means to provide for a reduction of the fluid pressure supplied to said brake means through said rapid discharge reducing valve means upon reopening of said solenoid operated valve means.

3,877,758

PROCESS FOR THE CONTROL OF AN ANTISKID BRAKING SYSTEM AND APPARATUS ADAPTED FOR PERFORMING THE SAME

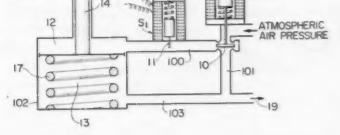
Kazutaka Kuwana, Kariya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya City, Aichi pref., Japan

Division of Ser. No. 82,027, Oct. 19, 1970, Pat. No. 3,756,662. This application June 29, 1973, Ser. No. 375,235

Claims priority, application Japan, Oct. 18, 1969, 44-083495

Int. Cl. B60t *8/10*

U.S. Cl. 303—21 F **5 Claims**



4. Apparatus for anti-skid brake control, comprising in combination,

a master cylinder,

a wheel cylinder,

passage means for hydraulic connection between said master cylinder and said wheel cylinder,

skid sensor means including means for sensing a wheel lock condition during a braking operation and for delivering a first signal upon sensing said lock condition and for sensing wheel lock recovery condition for delivering a second signal upon sensing said recovery condition, and further including means for sensing magnitudes of said wheel lock condition and wheel lock recovery condition,

cut-off valve means provided in said passage means for on-off control of said passage means,

volume increase and reduction means for increasing and decreasing the volume of said passage means leading from said valve means to said wheel cylinder,

servo means operatively connected to said valve means and said volume increase and reduction means, said servo means including cylinder and piston means having two separate chambers within said servo means on opposite sides of said piston means,

change-over valve means operable in response to said two signals from said sensor means and for establishment of a fluid pressure differential between said two chambers, and control valve means operable in response to said wheel lock condition and said wheel lock recovery condition sensed by said sensor means, said control valve means being operably connected to one of said chambers for varying the rate of fluid delivery to said servo means in response to operation of said change-over valve means,

whereby the rate of reduction in and restoration of the wheel cylinder brake pressure is controlled in response to the magnitudes of said wheel lock and wheel lock recovery conditions.

5. Method for anti-skid brake control comprising:

generating first, second, third, and fourth instruction signals in response to wheel rotational conditions, said first and second instruction signals being generated in response to wheel lock and wheel lock recovery, respectively, and said third and fourth instruction signals being generated in response to magnitudes of said wheel lock and wheel lock recovery, respectively,

reducing wheel cylinder pressure upon reception of said first instruction signal,

restoring the thus reduced wheel cylinder pressure upon reception of said second instruction signal,

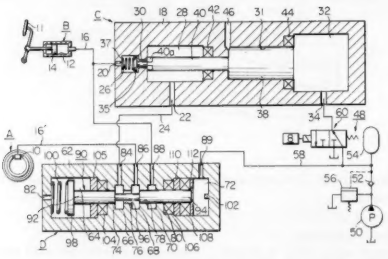
varying the rate of said wheel cylinder pressure reduction velocity upon reception of said third instruction signal, and

varying the rate of said wheel cylinder pressure restoration upon reception of said fourth instruction signal.

3,877,759
VEHICLE ANTI-SKID DEVICE

Tomoyoshi Sekiguchi, Yokohama, and Yasuhisa Takeuchi, Yokosuka, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama and Atsugi Motor Parts Company, Limited, Atsugi, both of, Japan

Filed Dec. 20, 1973, Ser. No. 426,537
Claims priority, application Japan, Dec. 23, 1972, 48-2052
Int. Cl. B60t *8/06*
U.S. Cl. 303—21 F **6 Claims**



1. An anti-skid device for a braking system of a vehicle having a manually actuable master cylinder, a brake cylinder communicable with the master cylinder and operative to apply braking force to a vehicle brake assembly in response to fluid fed thereinto under pressure from the master cylinder, a source of fluid pressure, and a sensor responsive to a selected vehicle operating parameter and operative to generate an electrical skid signal when level of the parameter is above a predetermined value indicating that the vehicle is in a skid condition; said anti-skid control device comprising:

a modulator valve disposed between the master cylinder and the brake cylinder and being communicable with the source of fluid under pressure;

a control valve disposed between the source and said modulator valve and being normally open to allow fluid communication therebetween;

said control valve being operative to close and thereby block fluid communication between the source and said modulator valve and fluid under substantially atmospheric pressure in response to the skid signal;

said modulator valve being operative to allow fluid flow therethrough when said control valve is open, and to block fluid flow therethrough and partially drain fluid from the brake cylinder to reduce the braking force applied by the brake cylinder to the brake assembly when said control valve is closed;

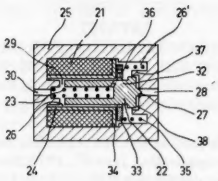
a bypass valve communicating with the source and being operative to allow fluid flow between the master cylinder and the brake cylinder through said modulator valve when the pressure of fluid in the source is above a predetermined level, and to block fluid flow through said modulator valve and provide a bypass fluid flow path around said modulator valve when the pressure of fluid in the source is below said predetermined level;

and an emergency control device including switch means for producing an electric actuation signal when the pressure of fluid in the source is below a predetermined level and a module connected to said switch means and said control valve for actuating said control valve so as to hold said piston at said position of maximum extension when it receives said actuation signal.

3,877,760
ANTI-LOCK VEHICLE BRAKE SYSTEMS

Michael George Cole; Derek Robert Skoyles, and Denis Sharp, all of Salfords near Redhill, England, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 263,421, June 16, 1972. This application Mar. 8, 1974, Ser. No. 449,357
Claims priority, application United Kingdom, July 12, 1971, 32541/71
Int. Cl. B60t *8/06*
U.S. Cl. 303—21 F **9 Claims**



1. An anti-lock vehicle brake system comprising a brake fluid pressure source, a brake fluid pressure line for operating a brake of the brake system, a relief connection, a solenoid valve mechanism connected between the brake fluid pressure line and the relief connection for operation under the control of a control circuit and wheel movement sensing means for producing a substantially linear decay of fluid pressure at the brake substantially from the commencement of each anti-lock period, said solenoid valve mechanism comprising:

A. a hollow magnetic structure having a fluid entry bore and a fluid exit bore connected to the brake fluid pressure line and the relief connection respectively;

B. an armature positioned in said hollow magnetic structure in the path of fluid flow from said entry bore to said exit bore;

C. a valve seal at the end of said armature for sealing said exit bore;

D. spring means within said hollow magnetic structure for urging said armature and therefore said valve seal against said exit bore in an exit bore sealing position;

E. energizing coil means mounted within said hollow magnetic structure and, when energized, moving said armature and therefore said valve seal into an exit bore open position by overcoming the sealing effect of said spring means, the opening of said exit bore permitting fluid in the brake fluid line to flow through said hollow magnetic structure from said entry bore to said exit bore to reduce the fluid pressure at the brake and;

F. a fluid flow control member positioned in the fluid flow path within said hollow magnetic structure for urging said armature toward its exit bore sealing position in response to fluid flow through said structure, such that said armature is moved toward said exit bore sealing position when

fluid flow through said structure exceeds a predetermined rate.

3,877,761

ELECTROMAGNETIC BEARING MEANS

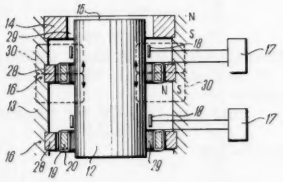
Karl Boden, Oberteuringen, and Dietrich Scheffer, Friedrichshafen, both of Germany, assignors to Padana AG, Zug, Switzerland

Filed Mar. 16, 1973, Ser. No. 342,148

Claims priority, application Germany, Mar. 20, 1972, 2213465

Int. Cl. F16c *39/06*

U.S. Cl. 308—10 **14 Claims**



1. In a magnetic bearing system for journalling a rotor radially about a rotor axis with respect to a stationary member, said rotor comprising at least a ferromagnetic portion: electromagnetic bearing means disposed on the stationary member adjacent said rotor ferromagnetic portion, means for sensing radial deviations of the position of the rotor from a predetermined position and adapted to produce electrical output signals in accordance with said deviations, said electromagnetic bearing means comprising an endless ferromagnetic core extending in a generally circumferential direction relative to said rotor axis and carried by said stationary member, and a winding wound about said endless ferromagnetic core the individual turns of said winding extending generally around cross sections of said core taken in planes containing said rotational axis, said winding comprising at least three coil portions connected to receive said electrical output signals whereby said winding produces at least three different magnetic fields to which the rotor is subjected.

3,877,762

TURBINE REAR BEARING SUPPORT STRUCTURE

William T. Dennison, West Hartford, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

Filed Mar. 19, 1974, Ser. No. 452,765

Int. Cl. F16c *35/00*

U.S. Cl. 308—15 **4 Claims**

1. A bearing support structure for a turbine shaft including:

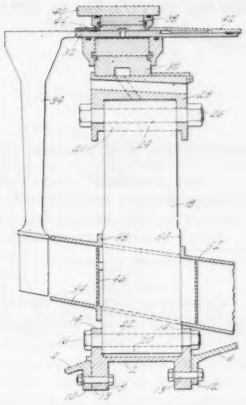
an outer casing ring;

an inner bearing support ring spaced from and concentric to the outer ring;

a plurality of struts extending between said rings and having a pivotal connection with each ring, the pivotal connection being parallel to the ring axis;

a bearing supported within the inner ring; and

a shaft supported by said bearing;



said struts being relatively flat and having enlargements at each end for the pivotal connections.

3,877,763

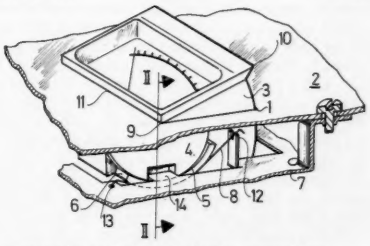
DISPLACEABLE SUPPORT FOR AN ELECTRIC INDICATING DEVICE

Werner Broghammer, Tennenbronn, Germany, assignor to Firma Dual Gebruder Stiedinger, Georgen/Black Forest, Germany

Filed Oct. 5, 1973, Ser. No. 403,894

Int. Cl. A47b *81/00*

U.S. Cl. 312—21 **3 Claims**



1. A support for an indicating device comprising

a cover plate, adapted to be supported by a base plate,

said cover plate having an opening,

an electric indicating device received in said opening of said cover plate,

a holding means for the adjustable holding of said electric indicating device in said cover plate,

said holding means further including segment-shaped supporting parts, secured to said indicating device,

said holding means including further lateral shell-shaped projections to form a circular slide path, the center point of said circular slide path lying on the upper edge of the lower side of said opening in said cover plate, in order to permit a swinging movement of said indicating device about an imaginary axis disposed at the upper edge of said lower side of said opening in said cover plate, bringing about a tight closure between said indicating device and said cover plate, and

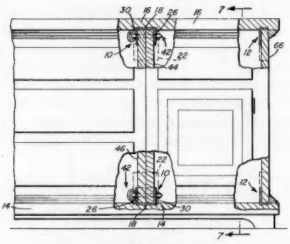
a spring wire supported on said base plate and engaging the bottom of said lateral shell-shaped projections to urge the latter towards said segment-shaped supporting parts.

3,877,764

FURNITURE MODULE LOCKING DEVICE

John A. Hillier, Jr., Mechanic St., North Bennington, Vt. 05257

Filed Oct. 25, 1973, Ser. No. 409,676
Int. Cl. A47b *87/00*
U.S. Cl. 312—107 **2 Claims**



1. A furniture system including a plurality of modular units, each unit comprising, in combination:

a. separate, vertically spaced base and top members;

b. a plurality of panels, including a back panel and a pair of spaced, parallel side panels, the back panel being arranged in perpendicular relationship with respect to the side panels, with each of the panels extending between the base and top members;

c. a plurality of brackets, each bracket mounted on one of the base and top members and arranged for receiving the back panel and one of the side panels, the brackets being substantially coextensive with the side panels, the brackets each including a longitudinal plate affixed to a face of one of the top member and bottom member that opposes the other member, the longitudinal plate having spaced, parallel, longitudinal edges and spaced longitudinal ends, a back plate connected to the longitudinal plate at a one of the ends of the latter and arranged extending perpendicularly from the longitudinal plate and associated member, and a flange connected to and arranged extending parallel to and perpendicularly from a one of the edges of the longitudinal plate codirectionally with the back plate for abutting one of the panels, the back plate spaced from an adjacent end of the flange a distance providing a slot arranged for receiving the back panel and one of the side panels, the back plate being connected to the back surface of the back panel, a portion of the brackets further including a further flange connected to the other of the edges of the longitudinal plate and arranged parallel to and extending codirectionally with the flange for forming a channel disposed for receiving adjacent side panels and a side panel of adjacent modular units; and

d. means including locking pins and openings provided in each of the flanges and further flanges of each of the portions of the brackets and in the side panels for receiving the pins and selectively attaching the portions of the brackets to adjacent side panels of adjacent units.

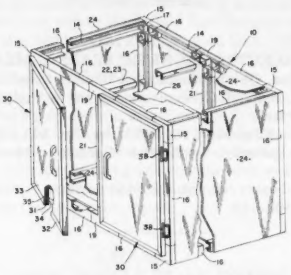
3,877,765

FURNITURE STRUCTURE

Edward J. Hassing, Seven Hills, Ohio, assignor to MPC Corporation, Cleveland, Ohio

Filed Aug. 14, 1972, Ser. No. 279,282
Int. Cl. A47b *47/00*
U.S. Cl. 312—257 R **15 Claims**

1. A furniture construction having a frame structure comprising injection molded channel-like corner members in each corner of the structure, said corner members connected with injection molded channel-like rail members extending between said corner members, means for interlocking said corner members with the ends of said rail members to secure and ridgidly close said frame.

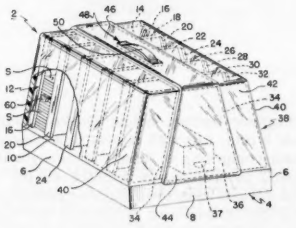


3,877,766

PORTABLE STORAGE AND/OR CARRIER DEVICE

Francis W. Seebald, 18801 E. Shoreland Dr., Rocky River, Ohio 44116

Filed Mar. 18, 1970, Ser. No. 20,696
Int. Cl. B65d *71/04*
U.S. Cl. 312—284 **14 Claims**



1. A portable storage and/or carrier device for photographic film or the like comprising,

A base and a housing structure mounted on said base,

said housing structure including at least one row of individual compartment sections extending transversely of said base,

each of said sections being generally open adjacent its upper end for receiving films downwardly therethrough and being closed adjacent its bottom by said base for storing films in superposed stacked relation therein, and

each of said sections being open adjacent its outermost side to provide accessibility to the film from the exterior of said device,

each of said sections includes a pair of spaced, oppositely disposed generally parallel side wall portions and a rear wall portion,

a bridge member made integral with and extending transversely across said side wall portion adjacent their upper ends,

said bridge member includes a handle means for portably carrying said device,

a detachable generally complementary shaped cover member removably mounted in encompassing relation over said housing,

said cover member being open adjacent its lower most end defined by a top and oppositely disposed side and end walls, and

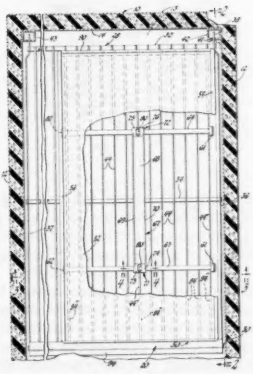
said top having a generally centrally disposed opening adapted to receive said handle means therethrough in the installed position thereof.

3,877,767

PULL-OUT TRAY FOR REFRIGERATOR SHELF

James A. Bright, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 11, 1974, Ser. No. 449,826
Int. Cl. A47j *47/00*; A47b *88/00*
U.S. Cl. 312—337 5 Claims



1. A removable roll-out tray assembly for a cabinet shelf which has spaced longitudinal wires, said tray assembly comprising, spacer guide means mounted on the shelf, said spacer guide means including front and rear pairs of transversely spaced longitudinally aligned hub portions, one set of front and rear aligned hub portions being located between a first pair of shelf wires and the other front and rear set of aligned hub portions being located between a second pair of wires, means for retaining each said pair of hub portions in fixed longitudinally spaced relation, a front transversely extending roller rotatably mounted in said front pair of hub portions, a rear transversely extending roller rotatably mounted in said rear pair of hub portions, each said front and rear roller in rolling contact on the wire shelf, means for retaining said front and rear pair of hub portions in fixed transverse spaced relation, a tray member having a plurality of longitudinally extending transversely spaced rib members on the undersurface thereof, said rib members having a predetermined depth such that said tray is rollingly supported in vertical spaced relation above said hub portions on said rollers, said tray assembly being operative to be rolled outwardly from the shelf forward edge to an extended position by means of said tray rib members rolling on said front and rear rollers while said rollers in turn roll on the longitudinal shelf wires whereby said tray member travels through a distance approximately twice the distance traveled by said rollers together with said spacer guide means.

3,877,768

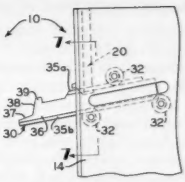
MONETARY PAPER VALIDATOR RECEPTACLE

Frank A. Novak, 7659 Edgewood Ln., Seven Hills, Ohio 44131, and Anthony H. Dolejs, 5600 Columbia Dr., Bedford Heights, Ohio 44146

Filed June 27, 1973, Ser. No. 374,073
Int. Cl. A47b *88/00*
U.S. Cl. 312—341 R 15 Claims

1. A receptacle for a paper validator comprising:

a housing having a slot,



a tray movable within said housing slot,

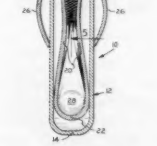
an escutcheon mounted on said housing above and in juxtaposition to said tray and said escutcheon having an inwardly and downwardly inclined surface.

3,877,769

CIRCUIT BOARD SOCKET

Quentin Berg, deceased, late of New Cumberland, Pa. (by Frances H. Berg, co-executor), and Dauphin Deposit Trust Co., co-executor, New Cumberland, Pa., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 23, 1973, Ser. No. 408,445
Int. Cl. H05k *1/02*
U.S. Cl. 339—17 R 15 Claims



1. An improved circuit board socket of they type adapted to be positioned within a circuit board hole and subsequently soldered to printed circuitry on the board, the socket including a hollow metal body, a mouth in the body communicating with the interior of the body, spring contact means within the body located to engage a lead inserted into the interior of the body through said mouth, means for tightly sealing said mouth comprising a portion of liquid viscous material flowed into said mouth and cured within the mouth to form a solid sealing plug, said means completely closing at least one section extending across the mouth, and an adherent connection between said means and the body at the mouth.

3,877,770

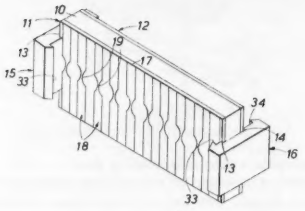
ELECTRICAL CONNECTOR ASSEMBLY

Laurie Albert Saunders, Crawley, and Michael John Champion, Basingstoke, both of England, assignors to International Standard Electric Corporation, New York, N.Y.

Division of Ser. No. 291,973, Sept. 25, 1972, abandoned. This application Dec. 3, 1973, Ser. No. 421,029
Claims priority, application United Kingdom, Nov. 1, 1971, 50633/71
Int. Cl. H05k *1/12*
U.S. Cl. 339—17 F 7 Claims

1. An electrical fusing arrangement comprising a first member formed of an electrically insulating material to which may be secured the ends of two flat cables with the conductive tracks on one of said cables being aligned with the conductive tracks on the other of said cables, a second generally flat member of insulating material having on at least one of its faces electrically conductive fuse tracks each having a reduced width region functioning as a fuse, said fuse tracks

extending in parallel relationship between opposite sides of said second member and being electrically isolated from each other, said second member being fitted to said first member



such that each of said fuse tracks bridges the gap between the conductive tracks on said flat cables, and latch means for rapidly, releasably fastening said first and said second members together.

3,877,771

APPARATUS FOR THE SOLDERLESS SPLICING OF MULTI-LEAD CABLES

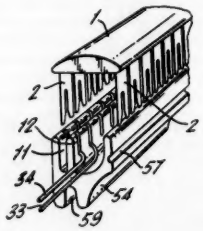
Leo Anker Jensen, Dalvej 15, Viby J., and Svend Christensen, Parkvangen 4, Solbjerg, both of Denmark

Division of Ser. No. 390,215, Aug. 21, 1973. This application July 25, 1974, Ser. No. 491,669

Claims priority, application Denmark, Aug. 21, 1972, 4126/72

Int. Cl. H01r *9/08*

U.S. Cl. 339—19 **10 Claims**



1. A splicing device for solderless splicing of a multi-lead cable such as a telephone cable to another cable or to outside wiring, said device comprising a channel-shaped cable retaining member having an open top and having an end portion sized to receive and retain the end portion of a cable in mounted position therein, said cable retaining member having a narrow groove extending along at least one side thereof and plurality of spaced transverse slots extending perpendicularly across said groove, each of said slots being sized to receive therein an inserted lead of the cable mounted in said cable retaining member, said device also comprising a top member of insulating material mounting a plurality of spaced incisive connectors, arranged in at least one longitudinal row, each of said connectors having a forked depending leg defining a central cutting slot therein, said legs being so spaced from each other that the distance between cutting slots in adjacent legs in said longitudinal row is equal to the distance between the spaced transverse slots in said cable retaining member, said top member being sized for insertion in aligned mounted position upon said cable retaining member to cover over the open top thereof, said row of incisive connectors being positioned on said top member such that the depending legs of said connectors enter the narrow groove of said cable retaining member when the top member is inserted in mounted position thereon.

3,877,772

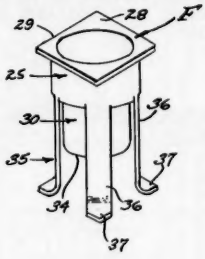
CONNECTOR ASSEMBLY FOR TERMINAL JUNCTION SYSTEM

Herbert A. De Cenzo, 3719 Cannon Ave., Las Vegas, Nev. 89121

Division of Ser. No. 173,422, Aug. 20, 1971, Pat. No. 3,784,963. This application Dec. 28, 1973, Ser. No. 429,030

Int. Cl. H01r *13/62*

U.S. Cl. 339—74 R **20 Claims**



1. A female electrical contact for captured installation within an axially disposed chamber in a body of dielectric material having opposed end closures and one with a coaxial opening for insertion of a male contact of right cylinder form therethrouogh and into coextensive interface engagement with the said female contact, said female contact being formed of a tubular body of electrically conductive material comprising; an elongated receiver section of full diameter cylinder form for engagement against said one end closure surrounding the opening therethrough to freely pass the male contact, elongated contact section of a smaller diameter than said full diameter and in split cylinder form continuing as an extension of the receiver section and projecting toward the other end closure to slideably engage the male contact, and a support means in the form of a leg extending from the full diameter of said receiver section and displaced from and spaced radially from the contact section and projecting axially therefrom for engegement against said other end closure of position the female contact within said chamber.

3,877,773

DOUBLE-ENDED CONDUCTOR-IN-SLOT CONNECTING DEVICE

Donald Judson Doty, Winston-Salem, and Robert Philmore Reavis, Jr., Statesville, both of N.C., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 29, 1973, Ser. No. 410,946

Int. Cl. H01r *11/20*

U.S. Cl. 339—97 P **5 Claims**

1. A conductor-in-slot electrical connecting device comprising:

a formed metallic tubular member of conductive sheet metal, said member having an axially extending open seam extending from one end thereof to the other end thereof, said seam serving as a conductor-receiving slot and having edges which are adapted to engage a conductor inserted into said slot,

said member being partially transversely severed intermediate the ends thereof from said edges partially around the circumference of said member whereby said member is divided into two separate spring systems, for reception of at least two conductors,

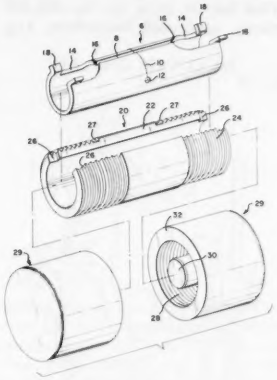
conductor-receiving means at each end of said member, each of said conductor receiving means comprising an opening in the wall of said member adjacent to said ends, each of said openings intersecting said edges of said conductor-receiving slot

a tubular insulating member in surrounding relationship to said metallic member, said insulating member having an

axially extending open seam which is in alignment with said open seam of said metallic member, and

insulating cover means each end of said tubular insulating member, said cover means being movable relatively towards each other on said tubular insulating member whereby,

upon locating a conductor in each of said openings with the axes of said conductors extending laterally of the axis of



said member, and upon moving said cover means towards each other said conductors are moved laterally of their axes and towards each other, and said conductors will be moved into said conductor-receiving slot and said edges will engage, and establish electrical contact with, said conductors.

3,877,774

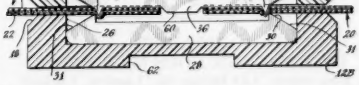
FLAT CABLE CONNECTOR

Robert F. Dorrell, Des Plaines, Ill., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Continuation-in-part of Ser. No. 310,059, Nov. 28, 1972, Pat. No. 3,824,529. This application Nov. 28, 1972, Ser. No. 310,057

Int. Cl. H01r *9/06*

U.S. Cl. 339—99 **23 Claims**



1. A connector for flat cables, said cables each having at least one insulation covered conductor comprising:

a housing having at least one cable receiving slot;

a moveable contact mounted in said housing adjacent said slot and moveable in a direction towards said slot, said contact having, on the side thereof adjacent said slot, a pointed projection for each of the cables to be joined;

a second contact mounted in said housing on the opposite side of said slot from the moveable contact, said second contact having a pointed projection for each cable to be joined, corresponding projections on said moveable and second contacts being relatively positioned so as to pinch the cable conductor therebetween when said driving means are operated; and

driving means mounted in said housing adjacent the opposite side of said contact and operable to drive the contact against cables positioned in said slot, said projections piercing the cable insulation to make physical and electrical contact with the conductors of the cables,

said driving means including a memory driving member comprised of a material which changes shape in response to the application of a predetermined amount of heat thereto, the change of shape of said memory driving member being chosen so that the application of said predetermined amount of heat thereto causes said driving member to drive said contact against said cables.

13. A connector for flat cables, said cables each having at least one insulation covered conductor comprising:

a housing having at least one cable receiving slot;

a moveable contact mounted in said housing adjacent said slot and moveable in a direction towards said slot, said contact having, on the side thereof adjacent said slot, a pointed projection for each of the cables to be joined; and driving means mounted in said housing adjacent the opposite side of said contact and operable to drive the contact against cables positioned in said slot, said projections piercing the cable insulation to make physical and electrical contact with the conductors of the cables,

said driving means including a memory driving member comprised of a material which changes shape in response to the application of a predetermined amount of heat thereto, the change of shape of said memory driving member being chosen so that the application of said predetermined amount of heat thereto causes said driving member to drive said contact against said cables,

said housing including a removable portion and being provided with spaced apertures located so as to be exposed when said removable portion is removed, said driving member being shaped to have ends extending into said apertures.

3,877,775

CABLE CONNECTOR

Thomas M. Barlow, and Donald J. Ruffner, both of Livermore, Calif., assignors to The United States of America as represented by the United States Atomic Energy Commission, Washington, D.C.

Filed Aug. 27, 1973, Ser. No. 391,086

Int. Cl. H01r *17/04, 3/00*

U.S. Cl. 339—117 R **9 Claims**

1. In a connector for making an electrical connection in a high-pressure environment with an electric cable of the type having at least one inner conductor and a mass of solid dielectric around the inner conductor, or conductors, the combination comprising:

a. a longitudinally extending support having a chamber extending longitudinally therethrough for the admission at its rearward end of said electrical cable therewithin, said chamber being larger than said dielectric in the transverse directions at at least one location,

b. means for structurally relating said cable to said support,

c. an elastomer boot one end of which is sealably fastened onto the outer surface of said support and the other end of which extends rearwardly thereof sealably engaging the outer surface of said cable, said boot and at least a

portion of said outer surface being dimensioned to provide a reservoir for a liquid therebetween,

d. means for transmitting the pressure of the environment which is applied to said reservoir through said boot to a liquid maintained in said chamber, and

said support being of a conducting material and said cable having an outer conductor around said solid dielectric and including means within said chamber for providing a transition between said outer conductor and said support.

3,877,776

SPECKLE REDUCTION IN HOLOGRAPHY

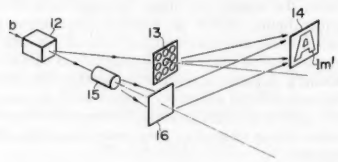
Yoshihiro Okino, Kyoto; Toshiro Kamogawa, Hirakata, and Makoto Kato, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 230,405, Feb. 29, 1972, abandoned. This application Apr. 25, 1974, Ser. No. 464,214

Claims priority, application Japan, Mar. 1, 1971, 46-10737; Mar. 1, 1971, 46-10738; Mar. 16, 1971, 46-14863; Mar. 16, 1971, 46-14864; Oct. 19, 1971, 46-83179

Int. Cl. G02b *27/00*

U.S. Cl. 350—3.5 **10 Claims**



9. The apparatus according to claim **8**, wherein said illuminating means comprises a composite beam having a diameter at the plane of said plate which is greater than the width of an individual hologram and less than the distance from the center of one individual hologram to the outer edge of a next adjacent individual hologram.

3,877,777

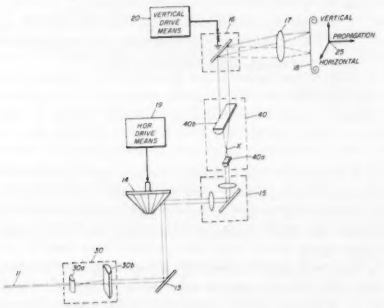
BEAM EXPANDER SUBSYSTEM FOR FILM SCANNER

William E. Glenn, Jr., Stamford, Conn., assignor to Columbia Broadcasting System, Inc., New York, N.Y.

Filed Nov. 15, 1972, Ser. No. 306,915

Int. Cl. G02b *17/00*

U.S. Cl. 350—7 **10 Claims**



1. In an apparatus for scanning a film in a horizontal line pattern with a light beam, the light beam being scanned in a horizontal reference direction by a moving optical scanner, an improved optical beam expander that effectively reduces horizontal scanline non-uniformities, comprising: means for receiving the horizontally scanned beam and for expanding said beam in the vertical reference direction before the scanning thereof on said film.

3,877,778

APPARATUS FOR ADJUSTING AN OPTICAL OBSERVATION INSTRUMENT

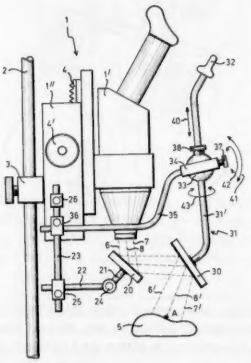
Rudolf Heller, Zurich, Switzerland, assignor to Contraves AG, Zurich, Switzerland

Filed July 29, 1974, Ser. No. 492,455

Claims priority, application Switzerland, Aug. 17, 1973, 11858/72

Int. Cl. G02b *23/02, 5/08*

U.S. Cl. 350—25 **3 Claims**



1. An apparatus for adjusting an optical observation instrument having an optical component elevationally adjustable at a stationary carrier component, the improvement comprising two reflectors supported at the carrier component for successively deflecting the field of vision of the observation instrument, means for retaining the one reflector in an adjustable position at the carrier component, an adjustment element having a first end and a second end, the other reflector being secured at the first end of the adjustment element, the other end of said adjustment element being constructed as a mouth piece, and means for hingedly mounting the adjustment element at the carrier component for enabling a random adjustment of the reflector secured at the adjustment element, the mouth piece being spaced from said optical observation instrument for engagement by a person's mouth whereby said other reflector can be adjusted by movement of the mouthpiece to vary the field of view simultaneously observed by the person through said optical observation instrument.

3,877,779

DUAL MAGNIFICATION MICROSCOPE

Dermot John Pierse, 143 Harley St., London, England

Continuation of Ser. No. 182,687, Sept. 22, 1971, abandoned. This application June 18, 1973, Ser. No. 371,244

Int. Cl. G02b *21/20*

U.S. Cl. 350—33 **13 Claims**

1. An optical microscope comprising:

an objective adapted to be trained upon an object to be viewed;

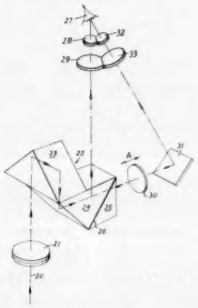
a pair of eyepieces respectively including first lens means and second lens means with intersecting optical axes closely juxtaposed for alternate viewing with the same eye of an observer at the point of intersection of said optical axes;

first optical means including said objective and said first lens means for establishing a first ray path for light from said object traversing said objective;

second optical means including said objective and said second lens means for establishing a second ray path for

light from said object traversing said objective, said first and second optical means having different degrees of magnification but presenting identically oriented images of said object to the observer's eye; and

semireflective means optically in line with said objective for splitting a light beam from said object into a reflected first



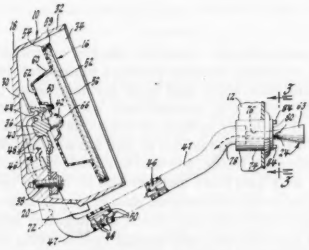
beam portion and an unreflected second beam portion respectively traveling over said first and second ray paths, said semireflective means being effective to distribute the light of said beam between said beam portions with an intensity ratio substantially equaling the ratio of the squares of the corresponding degrees of magnification.

3,877,780

HEATED REMOTELY CONTROLLED OUTSIDE REARVIEW MIRROR

Kendall D. Taylor, Flushing, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Sept. 24, 1973, Ser. No. 400,343
Int. Cl. G02b *5/08*
U.S. Cl. 350—63 **3 Claims**



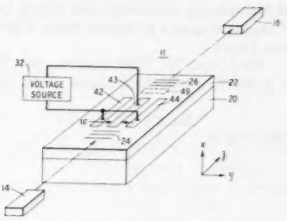
1. A heated remotely controlled outside rearview mirror for a motor vehicle comprising: housing means supported on the exterior of said motor vehicle having a cavity formed therein; a mirror element universally adjustably supported on said housing interior of said cavity, said mirror element having a viewing surface on which moisture tends to accumulate; actuator means positioned interior of the vehicle; a plurality of cables operatively connecting said mirror element and said actuator means universally positioning said mirror element in response to movement of said actuator means; conduit means surrounding the cables and forming a direct free passage flow therearound for the flow of air from said interior to said cavity whereby the negative pressure differential between said mirror cavity and said interior when the vehicle is in motion draws air from the interior through said conduit means to said cavity for raising the temperature of said mirror element and evaporating any moisture thereon.

3,877,781

ELECTRO-OPTICAL THIN-FILM DEVICE

Ivan Paul Kaminow, New Shrewsbury, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 16, 1974, Ser. No. 433,667
Int. Cl. G02b *5/14*
U.S. Cl. 350—96 WG **9 Claims**



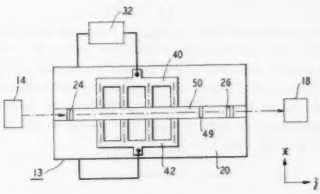
1. In combination in an integrated optical device, a substrate, electro-optic thin-film means on one surface of said substrate for propagating a laterally confined optical signal along a longitudinal path, and electrode means for establishing in a substantial extent of the longitudinal path of said thin-film means a modulating electric field that is oriented perpendicular to said one surface and confined to said thin-film means and the immediate region of the one surface of said substrate, wherein said electrode means comprises three longitudinally extending parallel spaced-apart electrodes on the top surface of said device, the center one of said electrodes being disposed on said thin-film means over and parallel to said longitudinal path, so that optical signals propagated along said longitudinal path are propagated directly under said center electrode, and means for coupling optical signals to said device to propagate therein in said thin-film means directly under said center electrode only.

3,877,782

ELECTRO-OPTICAL THIN FILM DEVICE

Ivan Paul Kaminow, New Shrewsbury, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 23, 1974, Ser. No. 435,694
Int. Cl. G02b *5/14*
U.S. Cl. 350—96.WG **2 Claims**



1. In combination in an integrated optical device, electro-optic thin-film means defining a longitudinally extending optical waveguiding path whose lateral extent is defined approximately by first and second longitudinal reference lines, and electrode means for establishing along a portion of said longitudinally extending waveguiding path a spatially periodic refractive index variation, said electrode means comprising plural longitudinally spaced-apart pairs of facing electrode fingers, the fingers of each such facing pair being spaced apart laterally the distance between said first and second longitudinal reference lines to encompass therebetween a portion of said waveguiding path, and further including a substrate, wherein said thin-film means comprises a thin-film longitudinal ridge of an electro-optic material on said substrate, and

wherein said electrode fingers are disposed on said substrate such that the facing ends of said fingers respectively abut the sides of said ridge.

3,877,783

GRADIENT REFRACTIVE INDEX LIGHT-CONDUCTING GLASS STRUCTURE

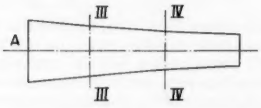
Hiroyoshi Matsumura, Osaka-shi, and Seiichi Ono, Itami-shi, both of Japan, assignors to Nippon Selfoc Kabushiki Kaisha, Tokyo-to, Japan

Filed Sept. 26, 1969, Ser. No. 861,247

Claims priority, application Japan, Sept. 28, 1968, 43-70467

Int. Cl. G02b *5/14*

U.S. Cl. 350—96 R **3 Claims**



1. A light-conducting glass structure having a predetermined refractive index and focusing effect comprising an elongated glass body having a center axis and having entrance and exit surfaces for light, both transverse to said center axis, and a side surface encompassing said center axis; said glass body having at least two kinds of cation means constituting glass-modifying oxides, wherein said at least two kinds of cation means are different in contribution to the refractive index of the glass and are ion-exchangeable with each other, and wherein the concentration within the glass of at least one of said cation means progressively decreases from said center axis toward said side surface and the concentration within the glass of at least one kind of remaining cation means progressively increases from said center axis toward said side surface; and said glass body having a refractive index gradient which is due to said concentration gradients, wherein said refractive index gradient produces said focusing effect, and is substantially expressed, at least in the vicinity of said center axis in each planar cross section perpendicular to said center axis, by the following equation:

$$n = n_o (1 - ar^2)$$

wherein n_o represents the refractive index of the glass at said center axis, n represents the refractive index at a distance r from said center axis, and a is a positive constant at the planar cross section, said positive constant being such that the value thereof increases from at least one surface of said entrance and exit surfaces for light toward the inside of the glass body along said center axis.

3,877,784

BEAM ADDRESS OPTICAL STORAGE HEAD

Burn Jeng Lin, Shrub Oak, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 20, 1973, Ser. No. 399,007

Int. Cl. G02b *5/14, 27/00*

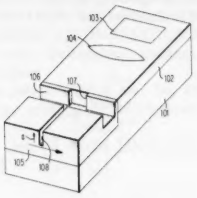
U.S. Cl. 350—96 WG **35 Claims**

1. An optical transducer providing high resolution focusing on a recore-track surface movable relative to said transducer in an optical storage system, comprising:

illuminating means for providing a monochromatic source of light,

slit-optics focusing means for focusing a spot of light smaller than the slit width dimension of said focusing means on said surface, and

a thin slit wider than the width of said slit-optics focusing means disposed between said illuminating means and said



slit-optics focusing means for focusing the light from said illuminating means on said slit-optics focusing means.

3,877,785

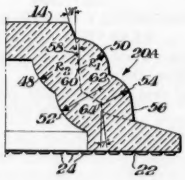
REFLECTIVE ROADWAY MARKER

Howard A. Schaefer, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio

Filed Oct. 12, 1973, Ser. No. 296,947

Int. Cl. G02b *5/12*

U.S. Cl. 350—104 **9 Claims**

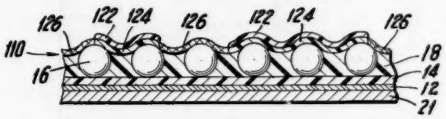


1. A retroreflective roadway marker comprising a body member, said body member having a peripheral rim and having top and side walls, said body member being of concave internally dished-out construction with an internal cavity exposed at its lower surface, at least one side wall being inclined inwardly from said rim to said top wall and disposed for facing oncoming traffic, a retroreflective optical system in said one side wall, said body member and its optical system being integral and made of tempered glass having an impact strength of at least 10,000 psi and which disintegrates into harmless particles upon failure, said optical system being exposed for angular dispersion up to a minimum of 20° deviation off axis of vehicle travel toward said marker, said optical including a smoothly curved spherical segment lens surface projecting outwardly from its side wall and disposed toward the exterior of said body member for receiving rays of light from the headlight of an approaching vehicle, a smoothly curved spherical segment reflective surface associated with said lens surface and disposed toward the interior of said dody for reflecting the light passing through said lens surface, the focal point of said lens surface being disposed with respect to said reflective surface to assure reflection of the light to the eyes of the driver as the vehicle continues to approach the marker, securing means on the lower surface of said rim for mounting said marker directly to the roadway surface without the necessity of partially embedding the marker below the roadway, and entirely all of said optical system being disposed above said securing means whereby the entire optical system is disposed above the roadway.

3,877,786
MULTICOLORED REFLECTIVE ARTICLE AND ITS MANUFACTURE

Peter J. Booras, Keene, N.H.; Richard S. Brenneman, Natick, and David W. Lovering, Needham, both of Mass., assignors to Yankee Artists, Incorporated, Keene, N.H.

Filed June 28, 1973, Ser. No. 374,484
Int. Cl. G02b *5/12*
U.S. Cl. 350—105 **17 Claims**

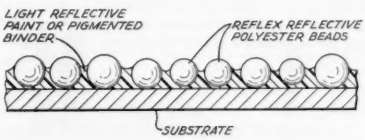


1. A colored article which comprises a reflex reflective substrate bearing a transparent solid surface layer of a color-receptive resinous material having at least one selected colored zone and at least one selected colorless zone, and at least one overlay of a solid nonporous resin composition resistant to liquid colorants, said overlay being affixed to said transparent surface of said substrate and overlying a selected colorless zone thereof.

3,877,787
REFLEX LIGHT REFLECTORS

Lloyd R. Buzbee, Pittsburgh, Pa., and John D. Hite, Atlanta, Ga., assignors to Koppers Company, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 215,653, Jan. 5, 1972, abandoned. This application Nov. 1, 1973, Ser. No. 411,629
Int. Cl. G02b *5/12*
U.S. Cl. 350—105 **23 Claims**



1. An improved reflex light reflector of the type comprising a multiplicity of clear reflex reflective spheres affixed to a light reflective surface and arranged so that light striking the spheres passes therethrough and is reflected by the light reflective surface back through the spheres toward the source of light wherein the improvement comprises using as the reflex reflective spheres polyester beads prepared by suspension polymerizing a curable resin composition of an ethylenically unsaturated polyester and a vinyl monomeric crosslinking agent in an aqueous suspension medium containing a water soluble salt.

3,877,788
METHOD AND APPARATUS FOR TESTING LENSES

Robert A. Sprague, North Chelmsford, and John A. O'Brien, Reading, both of Mass., assignors to Itek Corporation, Lexington, Mass.

Filed Mar. 30, 1973, Ser. No. 346,366
Int. Cl. G01b *9/00, 11/00*
U.S. Cl. 356—124 **20 Claims**

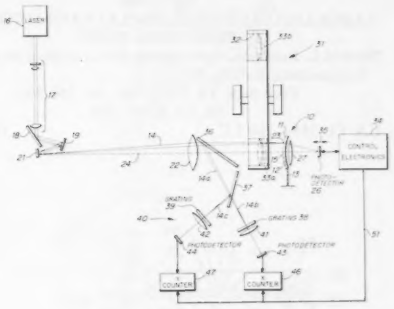
1. Apparatus for testing multifocal lenses comprising:

a. means for supporting a multifocal lens in position to be tested, said lens having at least first and second portions of different refractive power;

b. means for forming a light beam(s) having a cross-sectional diameter equal to a fraction of the surface area of said lens;

c. means for directing said light beam through an area in each of said first and second lens portions;

d. means for detecting said light beam after passing through each of said first and second lens portions and for producing signals indicative of the amount by which said light beam is deflected as a result of passing through each of said lens portions, the amount of said deflection being a



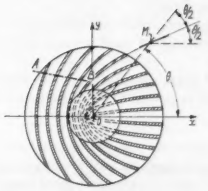
function of the refractive power of said first and second lens portions; and

e. means responsive to said signals for monitoring the amounts by which said light beam is deflected as a result of passing through said first and second lens portions and, hence, for monitoring differences in the refractive powers of said first and second lens portions for measuring a selected property of said lens.

3,877,789
MODE TRANSFORMER FOR LIGHT OR MILLIMETER ELECTROMAGNETIC WAVES

Georges R. P. Marie, 17, rue Croland, Fontenay-aux-Roses, France (92260)

Filed Oct. 26, 1973, Ser. No. 410,216
Claims priority, application France, Nov. 8, 1972, 72.39519; Jan. 9, 1973, 73.00550; Oct. 9, 1973, 73.36041
Int. Cl. G02b *5/30*
U.S. Cl. 350—147 **4 Claims**



1. A device for transforming a beam of rectilinearly polarized electromagnetic waves parallel to an axis into waves polarized in accordance with a symmetry of revolution, comprising a divergent first lens having an axis parallel to said axis and transforming said beam into a divergent conical beam, a convergent second lens having the same axis as said first lens and transforming said divergent beam into a convergent beam converging in a focus region of said second lens, at least one surface of said first lens being cut in a conical shape of revolution around its axis and said second lens having a plane front surface covered with an assembly of plane layers of anisotropic dielectric material whose propagation axes are directed at each point of said surface so as to transform said convergent beam into a wave polarized in accordance with a mode of revolution around said axis of said second lens, said second

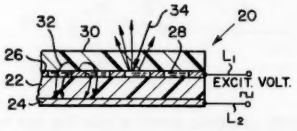
lens also having a convex back surface causing the transformed wave to converge in said focusing region; in which said assembly of layers forms half-wave plates and comprises a stack of thin layers alternately made of one and the other of two anisotropic substances having different dielectric constants, said substances being germanium and zinx sulphide.

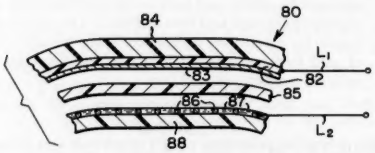
3,877,790

LARGE LIQUID CRYSTAL DISPLAYS AND METHOD OF PRODUCING THEM

Thomas L. Robinson, East Aurora, N.Y., assignor to Astronics Corporation, Buffalo, N.Y.

Filed Sept. 18, 1972, Ser. No. 289,860
Int. Cl. G02f *1/28*
U.S. Cl. 350—160 LC **15 Claims**





1. A display comprising

first and second electrodes disposed in spaced, parallel planes, said first electrode being an electrically-conductive foraminate screen having its interstices filled with a liquid crystal material which is normally transparent but which becomes turbulent in the presence of an electrostatic field,

a layer of dielectric material positioned between the confronting surfaces of said screen and said second electrode, and

a transparent plate covering one of said electrodes at the side thereof opposite to said dielectric layer.

3,877,791

DEFORMABLE MIRROR LIGHT VALVE AND METHOD OF MAKING THE SAME

William Ronald Roach, Rocky Hill, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 20, 1974, Ser. No. 444,098
Int. Cl. G02f *1/28*
U.S. Cl. 350—161 **3 Claims**

1. A method of constructing a deformable mirror light valve comprising the steps of:

a. depositing a transparent conductor layer on one surface of a transparent substrate,

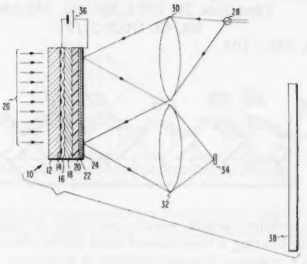
b. depositing a photoconductor layer on said transparent conductor layer,

c. depositing an elastomer layer on said photoconductor layer,

d. partially curing said elastomer layer, then

e. depositing a first conductive layer on said elastomer layer, said first layer providing good optical isolation and having the ability to adhere to said elastomer layer, and

f. curing said elastomer layer substantially fully,



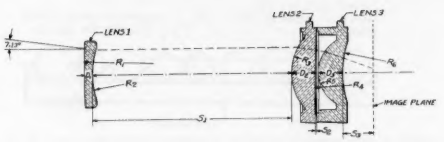
g. depositing a second conductive layer on said first layer, said second layer having good reflectivity and ductility.

3,877,792

SHORT FOCAL LENGTH, LARGE APERTURE OPTICAL SYSTEM

Arthur Cox, Park Ridge, and Walter J. Johnson, Mundelein, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed Apr. 12, 1974, Ser. No. 460,402
Int. Cl. G02b *3/04, 9/12*
U.S. Cl. 350—189 **2 Claims**



1. An optical system of relatively short focal length and large aperture having substantially the following specification:

TABLE 1

Lens	Radii(in.)	Thickness(in.)	Spacings(in.)
L_1	$R_1 = 4.4378$	$D_1 = .040$	
	$R_2 = -.4386$		$S_1 = 6.275$
L_2	$R_3 = .2734$		
	$*R_4 = -4$	$D_2 = .120$	
			$S_2 = .005$
L_3	$R_5 = .1735$		
	$R_6 = -.4793$	$D_3 = .125$	
			$S_3 = .153BFL$

ALL LENSES: $V = 57.4$ $N_D = 1.4917$

wherein the first column lists the lens elements numerically starting at the ray entrance side of the system which elements each have the same dispersive index and refractive index; the second column lists the respective radii and vertex radius of the aspheric surface $*R_4$, the third column lists the thickness D_1 to D_3 of the respective elements; and the fourth column lists the axial spacings S_1 to S_3 between the respective elements, and the image plane.

3,877,793
ZOOM LENS CASING

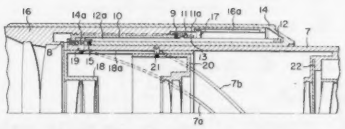
Sadao Nakagawa, Tokyo, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed July 26, 1973, Ser. No. 382,948

Claims priority, application Japan, Sept. 26, 1972, 47-110920

Int. Cl. G02b *15/00, 7/02*

U.S. Cl. 350—187 **4 Claims**



1. A casing assembly for a zoom lens of small telephoto ratio comprising a distance and zooming ring rotatably and axially movable to effect focusing and zooming, the ring having a peripheral groove and a pin; a stationary cylinder having camming grooves formed therein; a first lens-group fitting having a helicoid portion threadably engaged therewith, the helicoid portion being secured to the stationary cylinder and the first lens-group fitting having an axially extending groove, a rotatable cylinder mounted between the helicoid portion and the distance and zooming ring, the rotatable cylinder having an axially extending groove and a pin; the rotatable cylinder and the distance and zooming ring being connected by the engagement of the pin on the distance and zooming ring and the groove in the rotatable cylinder; the first lens-group fitting and the rotatable cylinder being connected by the engagement of the pin on the rotatable cylinder and the groove in the fitting; a second lens-group fitting having an axially extending groove and a pin, the pin being engaged in the peripheral groove of the distance and zooming ring and a camming groove of the stationary cylinder; and a third lens-group fitting having a pin, the pin being engaged in a camming groove of the stationary cylinder and in a groove of the second lens-group fitting.

3,877,794
PLASTIC LENS MOUNTING FOR VARIFOCAL OBJECTIVE

Elfriede Kulle, Waake, and Rolf Meyer, Gottingen, both of Germany, assignors to ISCO Optische Werke GmbH Gottingen, Gottingen, Germany

Filed Nov. 12, 1973, Ser. No. 414,826

Claims priority, application Germany, Nov. 10, 1972, 2255048

Int. Cl. G02b *7/10*

U.S. Cl. 350—187 **10 Claims**

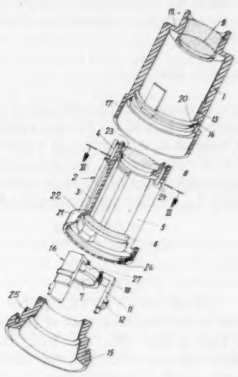
1. A mounting for a four-component varifocal lens group including a movable first component, a fixed second components, a movable third component and a fixed fourth component, comprising:

an outer lens barrel with a rear end forming a seat for said fourth component, said outer lens barrel having an inner wall surface with a plurality of peripherally spaced recesses bounded at the front by overhanging shoulders;

an inner lens barrel slidably telescoped in said outer lens barrel, said inner lens barrel forming two axially spaced seats for said first and third components and being provided with a plurality of peripherally spaced wall slots in line with said recesses extending axially from a front end thereof;

an insert comprising a central ring with a plurality of axially directed legs with forwardly extending free ends peripherally secured to said ring, said legs being received in said wall slots and in the recesses of said outer lens barrel aligned therewith, said ring forming a seat for said second component; and

fastening means for immobilizing said insert with reference to said outer lens barrel, said fastening means including



outer projections on said legs near their free ends received with a snap fit in said recesses in contact with said shoulders.

3,877,795
SMALL RETROFOCUS TYPE SUPER WIDE-ANGLE OBJECTIVE LENS SYSTEM

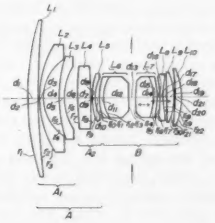
Nobuo Yamashita, Tokyo, Japan, assignor to Olympus Optical Company Limited, Tokyo, Japan

Filed May 1, 1973, Ser. No. 356,192

Claims priority, application Japan, May 4, 1972, 47-44326

Int. Cl. G02b *9/00, 1/00*

U.S. Cl. 350—214 **5 Claims**



1. A small retrofocus type super wide-angle objective lens system with a front divergent lens group A and a rear convergent lens group B, said front divergent lens group A consisting of front and rear lens groups A_1 and A_2, said front lens group A_1 consisting of a positive meniscus first component L_1 that has its object side a convex surface and two negative meniscus second and third components L_2 and L_3 that have their object sides convex surfaces; respectively, said rear lens group A_2 consisting of a positive lens fourth component L_4 that has its object side a convex surface, and a negative meniscus fifth component L_5 that has its object side a convex surface, and said rear convergent lens group B consisting of a biconvex positive lens sixth component L_6 that has its object side a convex surface having a larger curvature, a positive biconvex seventh component L_7 that has its object side a convex surface having a smaller curvature, a negative lens eight component L_8, and two positive meniscus lens ninth and tenth components L_9 and L_{10} that have their image sides convex surfaces, respectively, and which is defined by the following three con-

ditions, i.e.,

1) $0.45 < \frac{f_{123}}{f_{45}} < 0.6$

2) $5f < r_2 < \infty$

3) $1.4f < \Sigma d_R < 1.6f$

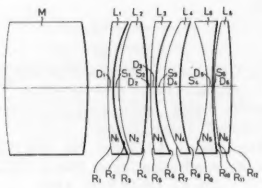
where f_{123} is a composite focal length of the first, second and third components L_1, L_2 and L_3, f is an overall focal length of the total lens systems r_2 is a radius of curvature of the rear surface of the first component L_1 and Σd_R is the sum of the air spaces and axial thicknesses of the sixth component L_6 to the tenth component L_{10} of the rear convergent lens group B.

3,877,796

REAR CONVERTER LENS

Shinji Yabe, and Kaoru Seiyama, both of Tokyo, Japan, assignors to Yabe Optical Inst. Mfg. Co., Ltd., Tokyo, Japan

Filed Oct. 25, 1973, Ser. No. 409,745
Claims priority, application Japan, May 1, 1973, 48-49252
Int. Cl. G02b 9/62
U.S. Cl. 350—215 **2 Claims**



1. A rear converter lens, of which the total focal length of lens components of the whole system is of negative refractive power, characterized in that the rear converter lens consists of six groups of lens components, wherein the first lens component from a master lens has a slightly convex surface towards the side of the master lens and is of negative refractive power; the second lens component being of positive refractive power; the third lens component having a slightly convex surface towards the side of the second lens component and being of negative refractive power; the fourth and the fifth lens components being of positive refractive power and being of negative refractive power respectively, which are confronting each other with sharp concavities at a distance of axial air space; and the sixth lens component being of positive refractive power, and that when

F represents the total focal length of the whole system;

$F_{1.2.3.4}$, the total focal length of lenses from the first to the fourth lens components inclusive;

$F_{5.6}$, the total focal length of lenses of the fifth and the sixth lens components;

L, the total axial length of the axial thickness added to the axial space of each lens component;

$F_1, F_2, \ldots$, the focal length of each lens component in order from the side of the object;

$R_1, R_2, \ldots$, the radius of curvature of refractive surfaces of each lens component in order from the side of the object;

$D_1, D_2, \ldots$, the axial thickness of each lens component in order from the side of the object;

$S_1, S_2, \ldots$, the axial space of each lens component in order from the side of the object;

$N_1, N_2, \ldots$, the refractive index of each lens component in order from the side of the object;

$V_1, V_2, \ldots$, the Abee number of each lens component in order from the side of the object;

following conditions will be satisfied:

$$|F_1| + |F_3| \leqq |F_2| + |F_4|,$$
$$|F_{1.2.3.4}| \geqq 2.5\,|F|,$$
$$|F_5| \leqq |F_6|,$$
$$F_{5.6} \leqq 1.7\,F,$$
$$|F_{1.2.3.4}| \geqq |1.5\,(F_{5.6})|,$$
$$L \leqq F/1.8,$$
$$S_4 \leqq F/\text{number of lens in the whole system},$$
$$|R_1| > |F| > |R_2|,$$
$$|R_3| < |F| < |R_4|,$$
$$|R_5| > |F| > |R_6|,$$
$$F > R_9 > F/N_5,$$
$$N_1 \geqq (N_1 + N_2)/2,$$
$$N_3 \geqq (N_3 + N_4)/2,$$
$$N_5 \geqq (N_5 + N_6)/2,$$

said lens further having the following values for F = −100 mm:

lens component	radius of curvature (mm)	N	V	D or S (mm)
L_1	R_1 = 260.141	1.88300	40.9	D_1 = 2.33
	R_2 = 66.018			S_1 = 2.18
L_2	R_3 = 77.369	1.68893	31.1	D_2 = 11.76
	R_4 = −172.156			S_2 = 1.63
L_3	R_5 = 272.950	1.81600	46.8	D_3 = 2.21
	R_6 = 73.601			S_3 = 3.26
L_4	R_7 = 57.330	1.60565	37.9	D_4 = 6.58
	R_8 = 92.449			S_4 = 11.11
L_5	R_9 = −75.546	1.88300	40.9	D_5 = 2.10
	R_{10} = 205.665			S_5 = 0.47
L_6	R_{11} = 134.407	1.60565	37.9	D_6 = 7.18
	R_{12} = −299.207.			

3,877,797

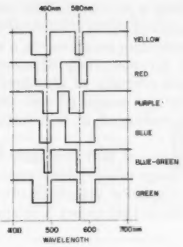
OPTICAL FILTER COMBINATION FOR IMPROVING COLOR DISCRIMINATION

William A. Thornton, Jr., Cranford, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 23, 1973, Ser. No. 408,961
Int. Cl. G02c 7/10; G02b 5/22
U.S. Cl. 351—44 **4 Claims**

1. An optical filter combination which, when interposed in a light path of illuminating radiations to alter at least one of (a) the illuminating radiations generated by a light source and

(b) the object-reflected radiations ultimately received by the viewer's eye, will enhance the color discrimination which is observed between objects of different colors, said filter consisting of two essential filtering means, one of said essential filtering means removing from the light path a selected band



of radiations which includes 580 nm radiations, and the other of said essential filtering means removing from the light path a selected band of radiations which includes 490 nm radiations and the bandwidth of the radiations removed by each of said essential filtering means being from 5 nm to 80 nm.

3,877,798

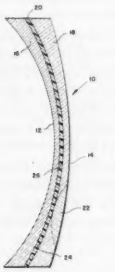
LAMINATED MULTI-FOCAL LENSES

Harry R. Tolar, Hotel Goldsboro Building, 150 S. Center St., Goldsboro, N.C., and Arnold P. Gresser, 3316 Old Post Dr., Pikesville, Md.

Continuation-in-part of Ser. No. 845,618, July 2, 1969, abandoned, which is a continuation of Ser. No. 391,916, Aug. 25, 1964, abandoned. This application Sept. 3, 1970, Ser. No. 69,192

Int. Cl. G02c *7/06*

U.S. Cl. 351—168 **10 Claims**



1. A finished laminated multifocal compound ophthalmic lens combination of acceptable thickness and which may be either positive or negative within the range of +15 to −12 diopters and including corrections for far sight, reading and astigmatism,

said combination having an outer spherical lens portion which is further away from the eye and inner lens portion which is closer to the eye,

said outer lens portion having refracting power and being a multi-vision lens and having an outer surface which is further away from the eye and an inner surface which is closer to the eye,

said inner lens portion being a single vision lens and having an outer surface which is further away from the eye and an inner surface which is closer to the eye,

the inner surface of said outer lens portion and the outer surface of said inner lens portion being adhesively joined, said lens assembly being characterized by

a. the outer surface of said outer lens portion being convex spherical and having a bifocal addition located on said outer surface of said outer lens portion,

b. the inner surface of said outer lens portion being concave of a single, standard pre-selected spherical curvature on the order of about six diopters,

c. the outer surface of said inner lens portion being convex spherical and complementary to the inner surface of said outer lens portion of single, standard preselected spherical curvature,

d. the inner surface of said inner lens portion including a cylinder correction, said inner lens portion being of non-uniform edge thickness,

e. one of a series of various diopter values of said multivision spherical outer lens portions having the capability and capacity to cooperate by algebraic addition with one of a series of various diopter values of said single vision inner lens portions of sphero-cylindrical character to produce said finished laminated multifocal compound ophthalmic lens of any value within said range of +15 to −12 diopters.

3,877,799

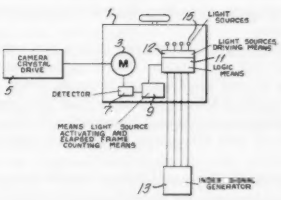
METHOD OF RECORDING THE FIRST FRAME IN A TIME INDEX SYSTEM

Leopold Henry O'Donnell, Toronto, Ontario, Canada, assignor to Her Majesty the Queen in right of Canada as represented by the Secretary of State, Ottawa, Canada

Filed Feb. 6, 1974, Ser. No. 439,918

Int. Cl. G03b *21/50*

U.S. Cl. 352—92 **8 Claims**



1. A system for recording an identification code on the beginning frames of a shooting sequence on a film in a movie camera, and used in conjunction with a multi-track format apparatus for exposing indexing information on the edge of said film;

said camera comprising a driving motor;

said apparatus comprising a source with a plurality of light sources placed adjacent the film edge and disposed across said film edge; and

said system comprising, detecting means for detecting the speed of said driving motor;

said detecting means providing a driving signal when the driving motor reaches its operating speed;

light source activating and elapsed frame counting means connected to said detecting means for connecting an activating signal to at least one of said plurality of light sources for a predetermined number of frame periods on reception of said driving signal and for counting frames elapsed after the activating signal has been connected;

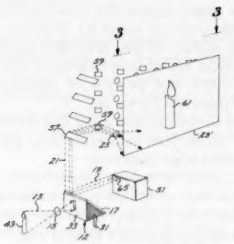
said activating signal being disconnected from said at least one of said plurality of light sources after said predetermined number of frame periods, and during alternate frame periods within said predetermined number of frame periods.

3,877,800

IMAGE TRANSMITTING APPARATUS

William S. Liddell, P.O. Box 1533, Avalon, Calif.

Filed Sept. 25, 1972, Ser. No. 291,719
Int. Cl. G03b *21/28*; G02f *1/36*; H04h *1/00*
U.S. Cl. 353—30 **10 Claims**



1. Image transmitting apparatus for transmitting light between remote locations, said apparatus comprising:

first and second housings;

first and second optically reflective conversion sheet means mounted on said respective first and second housings for receipt of low intensity image bearing light from respective first and second objects and locally operative in response to the intensity of the image bearing light to proportionately vary the optical reflectivity thereof;

first and second intensified light sources mounted on said respective first and second housings for directing high intensity light onto said respective second and first conversion sheet means for reflection therefrom as respective first and second high intensity image transmitting light having local intensities corresponding with the local reflectivity of such respective second and first conversion sheet means;

first and second light transmitting means mounted on said respective first and second housings for receiving the respective second and first high intensity image transmitting light reflected from the respective first and second conversion sheet means and transmitting it along respective paths to said respective second and first housings; and

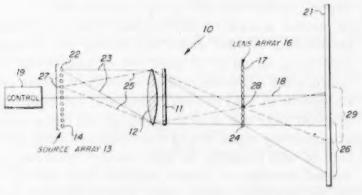
first and second display panel means on said respective first and second housings for receiving said respective second and first high intensity image transmitting light from said respective first and second transmitting means and operative in response thereto to display images corresponding with the respective second and first objects.

3,877,801

IMAGE TRANSLATION APPARATUS

Alan J. MacGovern, Acton, Mass., assignor to Itek Corporation, Lexington, Mass.

Filed Dec. 20, 1973, Ser. No. 426,992
Int. Cl. G03b *21/14*
U.S. Cl. 353—38 **10 Claims**



1. Image translation apparatus for projecting the image of an object to any one of a plurality of possible imaging positions comprising:

a. an object to be imaged;

b. means for illuminating said object, said object illuminating means including means for defining a plurality of illuminating positions from which said object may be illuminated;

c. means for defining a plurality of lens positions, said plurality of lens positions being positioned conjugate to said plurality of illuminating positions via a relay lens;

d. control means for selectively illuminating said object from one of said plurality of illuminating positions for presenting a focused image of said object to the lens position that is conjugate to said selected illuminating position; and,

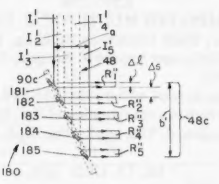
e. lens means located at said conjugate lens position for projecting said image of said object onto an image receiving medium at a position determined by the illuminating position from which said object is illuminated.

3,877,802

METHOD OF ENLARGING IMAGES WITHOUT LENSES AND DISPLAY DEVICE UTILIZING THE METHOD

Myron Greenspan, 154 Girard St., Brooklyn, N.Y. 11235

Filed Apr. 16, 1973, Ser. No. 351,495
Int. Cl. G03b *21/28*
U.S. Cl. 353—77 **18 Claims**



1. Display device for enlarging a two-dimensional image at least along one of its planar directions, comprising light beam forming means for forming a light beam having substantially parallel light ray portions oriented in a first direction, said parallel light ray portions together defining the image; scattering means for separating, along a direction corresponding to a planar direction of the image, said light ray portions into a plurality of spaced, substantially parallel light rays and for directing said light rays in spaced relation to one another in a second direction, whereby the dimension of the image as defined by said spaced light rays is greater than the corresponding dimension of the original image along said planar direction; and projecting screen means arranged to intercept said spaced light rays for forming an image defined by the latter.

3,877,803

CHARGING APPARATUS FOR ELECTRO-PHOTOGRAPHIC COPYING DEVICE

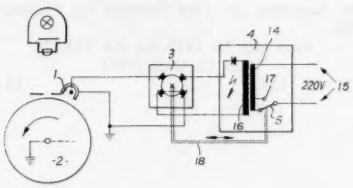
Walter Seliger, Dresden, Germany, assignor to VEB Pentacon Dresden Kamera-und Kinowerke, Dresden, Germany

Division of Ser. No. 163,283, July 16, 1971, abandoned. This application June 29, 1973, Ser. No. 374,873
Claims priority, application Germany, Mar. 12, 1971, 153800
Int. Cl. G03g *15/00*
U.S. Cl. 355—3 R **6 Claims**

1. An electrophotographic apparatus for the production of positive prints from positive and from negative originals with the same developer, including:

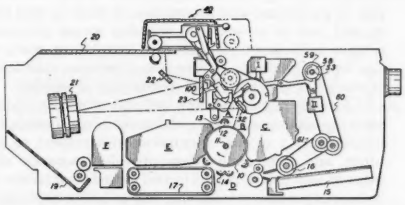
a. means for providing actinic light from an original to be copied;

b. a photoconductor for receiving said actinic light;
c. a charging electrode positioned near to the photoconductor, for charging the photoconductor;
d. electrical circuit means for providing said charging electrode with a charging potential, including a transformer having a primary winding connectable with an alternating voltage source, and a secondary winding connected with the charging electrode via a charge polarity reversing switch to enable the photoconductor to be charged selec-



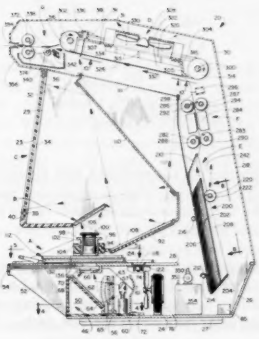
tively with a first polarity when a postive original is to be copied and with the opposite polarity when a negative original is to be copied, said primary winding having a tapping point thereon;
e. charge potential adjusting means including a switch actuable by said charge polarity reversing switch adapted to connect the alternating voltage source selectively across the whole winding or part of the winding via said tapping point for adjusting said charge potential when said charge polarity is reversed by said reversing switch.

3,877,804
CORNER REGISTRATION DEVICE FOR DOCUMENT FEEDER
Werner F. Hoppner, Webster, N.Y., assignor to Xerox Corporation, Stamfcrd, Conn.
Filed Nov. 2, 1973, Ser. No. 412,225
Int. Cl. G03g *15/00*
U.S. Cl. 355—8 **10 Claims**



1. An electrostatographic copying apparatus including means for forming an image of the original input scene information on a document for projection onto a photosensitive surface, a document feeder for feeding said documents in a desired direction past said imaging means, said feeder including at least one set of pinch rolls having a closed nip for advancing said documents, the improvement wherein: corner registration means are provided for aligning said document prior to its advancement, said registration means including a first registration barrier extending in a direction substantially parallel to the direction in which said document is to be fed, said barrier adapted to contact the first side of said document, a second registration barrier extending substantially normal to said first barrier, said second barrier adapted to contact the second side of said document, said second barrier comprising the closed nip of said pinch rolls, and means for inhibiting the rotation of said pinch rolls during registration of said document, said inhibiting means comprising a normally engaged clutch interposed between said drive means and said pinch rolls and first switch means for disengaging said clutch so that said drive is effective to rotate said pinch rolls except when said first switch means disengages said clutch.

3,877,805
ELECTROSTATIC VIEWER-COPIER APPARATUS WITH LIQUID DEVELOPING MEANS THEREFOR
Stanley W. Heldenbrand; David L. Johnson, both of Dallas, and Neil H. Mote, Richardson, all of Tex., assignors to Seaco Computer-Display Incorporated, Garland, Tex.
Division of Ser. No. 166,953, July 28, 1971, Pat. No. 3,811,769. This application Sept. 28, 1973, Ser. No. 401,819
Int. Cl. G03g *9/04, 13/10, 15/10*
U.S. Cl. 355—10 **10 Claims**



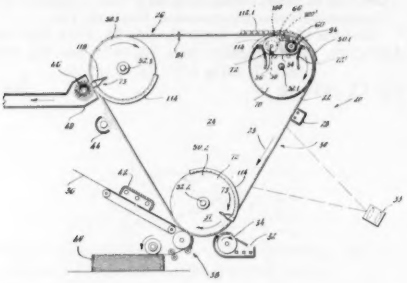
1. An apparatus for producing information on copies of record medium, comprising:
means for providing a uniform electrostatic charge on said record medium,
means for creating an electrostatic charge pattern corresponding to said information on said record medium, thereby to produce a latent image on said medium corresponding to said information,
means for applying developer to said record medium to produce a visible recorded image corresponding to said latent image on said record medium, and
means for conveying said record medium past said developer applying means,
said developer applying means comprising:
i. guide means including a roller rotatably driven,
ii. a nozzle positioned to dispense developer adjacent said roller and in a manner which causes said developer to be urged in an upward direction against the underside of said conveyed record medium when said record medium is in a substantially horizontal position, said nozzle having an elongated dispensing opening extending across said moving record medium in a direction transverse to the direction of movement of said record medium during said conveying.

3,877,806
PHOTOCOPY MACHINE WITH PHOTOCONDUCTOR BELT AND CARTRIDGE FOR PHOTOCOPYING
Ernst Schrempp, Norwalk, and Henry S. Hazelton, Jr., Fairfield, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.
Filed Mar. 7, 1974, Ser. No. 449,033
Int. Cl. G03g *15/00*
U.S. Cl. 355—16 **23 Claims**

1. A photoconductor belt assembly for a photocopy machine comprising

a photoconductor belt shaped to fit around and defining a photoconductor belt path and mounted to move along said path in a photocopy machine, the photoconductor belt having a replacement segment to form a belt length in excess of the path length to facilitate replacement of used photoconductor belt segments;

a photoconductor belt cartridge connected to the photoconductor belt and mounted in the photocopy machine to



move with the photoconductor belt along the belt path, said cartridge having a photoconductor supply element for storing the replacement segment of the photoconductor belt and having a photoconductor take-up element for storing used belt portions; and

means operatively associated with the take-up element for causing incremental photoconductor take-up movement in addition to said belt movement during passage of the photoconductor belt along the belt path.

3,877,807

IMAGE SCANNING DEVICE IN A PHOTOCOPYING APPARATUS

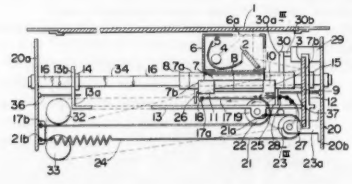
Takaji Kurita, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Mar. 12, 1974, Ser. No. 450,448

Claims priority, application Japan, Apr. 17, 1974, 49-45977

Int. Cl. G03g *15/04*

U.S. Cl. 355—66 **5 Claims**



1. An image scanning device for directing images of successive portions of an original document onto a moving photosensitive material in a photocopying apparatus comprising a first mirror assembly supporting member, a second mirror assembly supporting member, a plurality of bearing members, at least one shaft, said first and second mirror assembly supporting members being individually supported by respective bearing members on said at least one shaft, and moved in the same direction parallel to said document, said second mirror assembly supporting member being moved at a half speed of said first mirror assembly supporting member, whereby the length of the optical path from said document to said photosensitive material is maintained constant during scanning of said original document, said bearing members of the first mirror assembly supporting member positioned between said bearing members of the second mirror assembly supporting member on said at least one shaft, and the distance between said bearing members of the second mirror assembly supporting member being at least equal to the sum of the distance between said bearing members of the first mirror assembly supporting member and a half of a movable distance of said first mirror assembly supporting member.

3,877,808

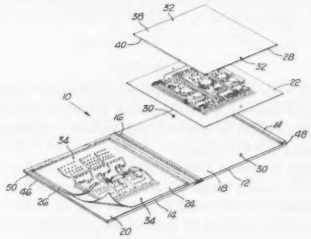
PRINTED CIRCUIT BOARD EXPOSURE HOLDING DEVICE

Carl R. Jasperson, Jr., 1164 Pasadena St., Pomona, Calif. 91766

Filed Aug. 30, 1973, Ser. No. 393,174

Int. Cl. G03b *27/04*

U.S. Cl. 355—128 **13 Claims**



1. An exposure mounting device for exposing both faces of a circuit board, said device comprising:

a pair of panels;

a first layout mask accurately located at a first position on one of said pair of panels;

a second layout mask accurately located at a second position on the other of said pair of panels;

said first position of said first layout mask and said second position of said second layout mask being accurately aligned with respect to each other when said pair of panels are in face-to-face relation;

means for securing said first layout mask to said one of said pair of panels and said second layout mask to said other of said pair of panels, said securing means preventing relative movement between said first layout mask and said one of said pair of panels and between said second layout mask and said other of said pair of panels;

means for pivotally connecting said pair of panels together, allowing said panels to accurately pivot between an opened and a closed orientation with respect to each other, said connecting means providing accurate alignment of said pair of panels in said closed orientation, said connecting means maintaining said accurate alignment of said first and second layout masks with respect to each other as said pair of panels are moved between said opened and closed orientations; and

means located on one of said panels for registering said printed circuit board within said panels.

3,877,809

DEVICE FOR INDICATING THE SIZE OF COPY SHEETS AND THE COVERAGE OF COPYING

Shigeru Suzuki, and Yuichi Kobayashi, both of Yokohama, Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Feb. 23, 1973, Ser. No. 335,310

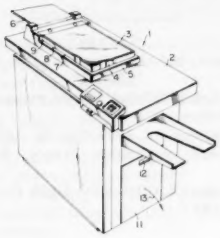
Claims priority, application Japan, Mar. 9, 1972, 47-28619

Int. Cl. G03b *27/00*

U.S. Cl. 355—133 **4 Claims**

1. A copying machine, comprising feed tray means for releasably receiving a copy sheet cassette containing a plurality of copy sheets, the size of said plurality of copy sheets being one of a plurality of selected different sizes; a transpar-

ent plate for supporting an original for copying; a plurality of indicator lamps arranged along one edge of said plate and visible from outside the machine, each lamp being spaced a predetermined distance from one end of said plate perpendicular to said edge, said predetermined distance corresponding to the maximum extremity of the coverage of copying and



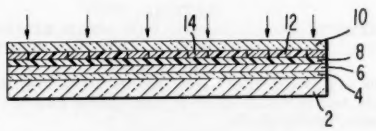
corresponding to copy sheets of a selected one of said plurality of different sizes contained in said cassette received by said tray means; switch means for detecting the size of the last recited sheets; and electrical circuit means for turning on one of said plurality of indicator lamps in response to the detection of size by said switch means.

3,877,810

METHOD FOR MAKING A PHOTOMASK

Nathan Feldstein, Kendall Park, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Nov. 8, 1972, Ser. No. 304,594
Int. Cl. G03b *27/02*; **G03c** *5/00*
U.S. Cl. 355—133 **2 Claims**



1. A method of making a photomask having a pattern of darkened areas comprising the steps of:

depositing a layer of cobalt on a glass surface,

covering said cobalt layer with a layer of photoresist,

exposing said layer of photoresist to provide a pattern of hardened areas corresponding to the darkened areas in the final mask, and unhardened areas corresponding to clear areas in the final mask,

developing said photoresist thereby removing the unhardened areas of said photoresist to expose areas of said cobalt,

etching away said exposed areas of cobalt leaving a pattern of cobalt areas on said glass surface covered with hardened photoresist,

removing said hardened areas of photoresist over said pattern of cobalt areas, and

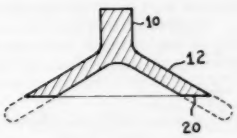
heating said pattern of cobalt areas to a temperature of 200°–450° C in the presence of oxygen and moisture to convert said cobalt areas into cobalt oxides which are light-absorbine and have a brown-black color.

3,877,811

STANDARD SPECIMENS FOR USE IN EMISSION SPECTROGRAPHY

Michel Mentrier, Coublevie, and Henri Pichery, Tarascon, both of France, assignors to Compagnie Pechiney, Paris, France

Filed Aug. 12, 1970, Ser. No. 63,200
Int. Cl. G01j *3/02*
U.S. Cl. 356—85 **2 Claims**



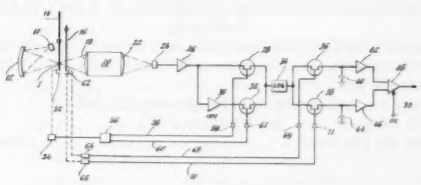
1. A cast test specimen for use in determining the composition of metallic alloys by emission spectrography comprising a thin-walled cup defined by a generally conical side wall having a U- or V-shaped cross section, with the mouth of the cup having been machined to provide an annular planar surface substantially perpendicular to the axis of the cup whereby the planar surface intersects all solidification fronts of the cast specimen without being tangent to the solidification fronts.

3,877,812

MULTIPLE WAVELENGTH SPECTROMETER

Duane T. Thompson, Norwalk, Conn., assignor to Wilks Scientific Corporation, South Norwalk, Conn.

Filed Jan. 31, 1973, Ser. No. 328,240
Int. Cl. G01j *3/02*, *3/42*
U.S. Cl. 356—97 **8 Claims**



1. A multiple wavelength radiation analyzer which comprises: means for detecting electromagnetic radiation from a radiation source; a chopper intermediate said source and detecting means positioned to chop said radiation at a first frequency; means for supporting a plurality of filters is close spatial relationship to said chopper; and means driven by said chopper for positioning said supporting means to periodically, repetitively, and alternatively insert each of said filters into the path of said radiation between said source and detecting means for a preselected observation period greater than the chopping period and keeping each filter stationary during its respective observation period.

3,877,813

SELF-COMPENSATING INTERFEROMETER

Cecil L. Hayes, Placentia, and Walter C. Davis, Tustin, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

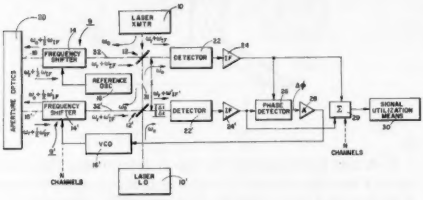
Continuation-in-part of Ser. No. 282,621, Aug. 21, 1972, abandoned. This application Sept. 17, 1973, Ser. No. 398,282
Int. Cl. G01b *9/02*
U.S. Cl. 356—106 R **8 Claims**

1. A multi-channel electromagnetic energy system of a type having at least two substantially parallel channels, each of said

channels having a first extremity comprising an aperture of said system and further having a second extremity including a non-linear detector responsive to electromagnetic energy propogated toward said second extremity, said system further including in combination

mutually oppositely and coaxially disposed first and second like electromagnetic energy generators having a common optical axis, said common axis being arranged perpendicular to said mutually parallel optical channels;

a first and second beam splitter each substantially disposed along said common optical axis of said coaxial generators



and within the optical path of a mutually exclusive one of said two channels, a first one of said generators cooperating with said beam splitters as a transmitter of energy out of said apertures of said system and a second one of said generators cooperating with said beam splitters as a local oscillator; and

phase-sensitive feedback modulation means responsive to the time-phase difference between the outputs of said photoelectric detectors for compensatorily modulating one of said channels in such sense as to reduce said phase difference.

3,877,814

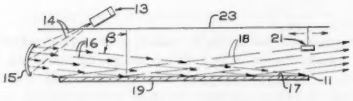
METHOD OF AND APPARATUS FOR DETECTING CONCAVE AND CONVEX PORTIONS IN A SPECULAR SURFACE

Daniel J. Hess, Cumberland, Md., and Robert J. Obenreder, Corapopolls, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 7, 1973, Ser. No. 330,369

Int. Cl. G01n *21/32*

U.S. Cl. 356—120 **5 Claims**



1. A method of sensing concave and convex portions in a first surface of a piece of glass, wherein the piece of glass has a second surface opposite to the first surface, comprising the steps of:

directing a collimated beam of light toward the piece of glass at an oblique angle of incidence selected (1) to reflect beams of light from the first surface of the piece of glass as first reflected beams of light; (2) to transmit beams of light through the piece of glass to reflect beams of light from the second surface through the first surface as second reflected beams of light; and (3) to enhance the intensity variations of the first reflected beams of light reflected from concave and convex portions in the first surface of the piece of glass;

intercepting the first and second reflected beams of light by photosensing means positioned at a distance from the first surface approximately equal to or less than the focal length, at the selected oblique angle of incidence, of the smallest expected radii of curvature of concave portions in the first surface to differentiate between diverging beams of light from convex portions and converging beams of light from concave portions in the first surface of the piece of glass; and

providing relative motion between the piece of glass and the photosensing means to monitor intensity variations of the first and second reflected beams of light wherein intensity variations sensed by the photosensing means are primarily a function of concave and convex portions in the first surface of the piece of glass.

3,877,815

MONITORING MEANS FOR MAKING HEADLAMP LENSES

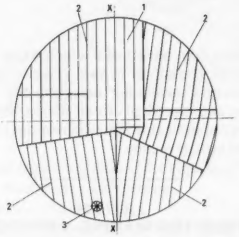
Roger Habert, Epinay/S/Seine, France, assignor to Ducellier et Cie, Paris, France

Filed Mar. 14, 1973, Ser. No. 340,979

Claims priority, application France, Mar. 16, 1972, 72.09171

Int. Cl. G01b *9/00*; **G02b** *5/04*

U.S. Cl. 356—124 **5 Claims**



1. In a molded headlemp lens producing a defined optical pattern in use, the improvement comprising an area for testing the condition of a lens forming mold, said area being small with respect to the lens and having a raised molded portion with sharp edges, said testing area having substantially no effect on said optical pattern.

3,877,816

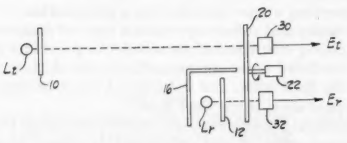
REMOTE-ANGLE-OF-ROTATION MEASUREMENT DEVICE USING LIGHT MODULATION AND ELECTRO-OPTICAL SENSORS

Ralph A. E. Weiss, Glen Burnie, and Donald G. Frey, Ellicott City, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 19, 1974, Ser. No. 462,488

Int. Cl. G01b *11/26*

U.S. Cl. 356—138 **10 Claims**



1. Apparatus for measuring rotational angle which comprises in combination:

means for directing electromagnetic waves having initial random polarization along a plurality of paths;

a plurality of sensor means adapted to receive said electromagnetic waves separately along said paths for providing sinusoidal signals;

means for continuously rotating a plane polarizer disc transverse to said paths;

reference means for plane polarizing electromagnetic waves along one of said paths;

rotary measuring means for plane polarizing electomagnetic waves along a second of said paths; and

means for comparing phase difference between sinusoidal signals from said plurality of sensors representative of electromagnetic waves modulated along said paths and for generating a signal representative of said phase differences, whereby a difference in rotational angle between said reference means and said rotary measuring means is obtained.

8. An electro-optical system for rotational angle measurement which comprises:

a rotatable linear target polarizer;

a first unpolarized radiation source for directing radiation through said target polarizer;

a linear reference polarizer;

a second unpolarized radiation source for directing radiation through said reference polarizer;

a constant speed rotating disc linear polarizer adapted to modulate radiation from the target polarizer and the reference polarizer;

first radiation sensor means for generating an output signal representative of the modulated target polarizer radiation;

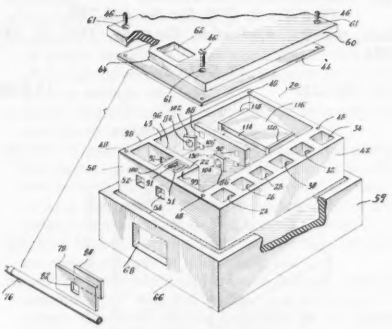
second radiation sensor means for generating an output signal representative of the modulated reference polarizer radiation; and

means for detecting phase difference between output signals from the first and second sensor means and generating a signal representative of rotational angle between said target and reference polarizers.

3,877,817
TEMPERATURE STABILIZED PHOTOMETER FOR KINETIC ANALYSIS

Wilson Ralston, 99 Prospect St., Stamford, Conn. 06901

Filed July 2, 1973, Ser. No. 375,419
Int. Cl. G01j *3/46, 3/42*
U.S. Cl. 356—180 **17 Claims**



1. A temperature stabilized photometric instrument for kinetic analysis comprising:

means providing an instrumentation housing,

said housing means including a body formed of a thermally diffusive material having a wall segment and a light permeable passage formed in said wall segment;

a photometric light source positioned outside of said instrumentation housing and arranged for projecting a light beam through said passage to the interior of said housing;

means for receiving and supporting a translucent vessel containing a sample material for analysis in the path of said light beam within said housing;

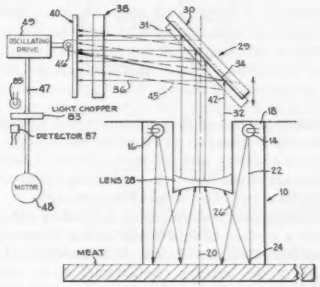
photodetection means positioned within said housing body for receiving light which is transmitted from said vessel and for providing an electrical signal representative of an optical characteristic of said sample material; and,

thermally diffusive means positioned between said sample vessel and said photodetection means for diffusing thermal energy and for reducing transient temperature changes at said detector means upon the introduction of a sample vessel into said sample receiving means.

3,877,818
PHOTO-OPTICAL METHOD FOR DETERMINING FAT CONTENT IN MEAT

George F. Button, Port Republic, and Karl H. Norris, Beltsville, both of Md., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jan. 28, 1974, Ser. No. 437,094
Int. Cl. G01n *21/22*
U.S. Cl. 356—186 **20 Claims**



1. A method for measuring the fat content of a meat sample comprising the following steps:

illuminating a meat sample with radiation that is then reflected along a predetermined path; systematically changing the wavelength of the reflected radiation over a wavelength band that corresponds to the radiation absorption band of meat fat, at an intermediate point along the path; detecting a varying energy level of the reflected radiation as the wavelength is changed; measuring the change in energy level divided by the average energy level as the wavelength changes; and calibrating the measurement to correspond with the fat content in the sample.

3,877,819
APPARATUS FOR DETECTION OF PHOSPHORUS OR SULFUR CONTAINING VAPORS OR AEROSOLS

Edward C. Haas, Rapid City, S. Dak., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 21, 1968, Ser. No. 707,926
Int. Cl. G01j *3/48*
U.S. Cl. 356—187 **7 Claims**

1. A hydrogen burner for producing a color spectrum from the chemiluminescent burning of contaminant-bearing vapors and aerosols comprising, in combination:

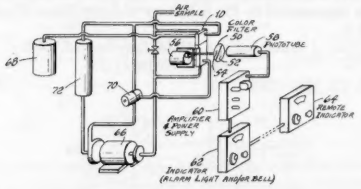
a substantially rectangular block of metal having borings therethrough forming a first burner, a second burner, a flame channel, an ignition chamber, at least one viewing port and a water channel,

said first burner comprising a transverse channel near the upper end of said block having a hydrogen inlet port at one end thereof and an air inlet port at the other end, a longitudinal burning chamber connecting with said inlet channel and extending downward therefrom, and a transverse exhaust channel which extends orthogonally from

said burning chamber and is narrow in diameter relative to the diameters of said inlet channel and said burning chamber,

said second burner comprising a longitudinal burning chamber and a transverse ignition chamber, said burning chamber connecting at one end with said hydrogen inlet port and one end of said first-burner inlet channel and connecting near its other end with said first-burner exhaust channel, said ignition chamber connecting with said second-burner chamber at the level of said first-burner exhaust channel and forming a virtual extension thereof to an outer surface of said block,

said flame channel connecting with the other end of said second-burner chamber and extending downward therefrom, the diameter of said flame channel being narrow



relative to that of said second-burner chamber but increasing in diameter at its other end to form an exhaust port connecting with an outer surface of said block, the diameter of the flame channel being designed to provide a high-velocity flow of gas therethrough,

said viewing port comprising an undercut portion extending from a surface of said block to said flame channel in a location which permits the chemiluminescent color spectrum of the burning contaminant to be viewed but is sufficiently far from the oxidizing portion of the flame in said second burner to exclude the light from the oxidizing portion from view,

said water channel extending longitudinally through said block and having an inlet and an outlet port;

a cover for said viewing port comprising a transparent pane and holding means therefor, said holding means being shaped to fit into said viewing port and to be held therein so that said flame channel can be viewed through said pane; and

an ignition device seated in said ignition chamber for igniting the gases in said first and second burners.

3. A system for detecting the presence of contaminant-bearing aerosols and vapors by means of the color spectrum emitted from the chemiluminescent burning thereof comprising, in combination:

a high-velocity-flame hydrogen burner comprising

a substantially rectangular block of metal having borings therethrough forming a first burner, a second burner, a flame channel, an ignition chamber, at least one viewing port and a water channel,

said first burner comprising a transverse channel near the upper end of said block having a hydrogen inlet port at one end thereof and an air inlet port at the other end, a longitudinal burning chamber connecting with said inlet channel and extending down-ward therefrom, and a transverse exhaust channel which extends orthogonally from said burning chamber and is narrow in diameter relative to the diameters of said inlet channel and said burning chamber,

said second burner comprising a longitudinal burning chamber and a transverse ignition chamber, said burning chamber connecting at one end with said hydrogen inlet port and one end of said first-burner exhaust channel, said ignition chamber connecting with said second-burner chamber at the level of said first-burner exhaust channel and forming a virtual extension thereof to an outer surface of said block,

said flame channel connecting with the other end of said second-burner chamber and extending downward therefrom, the diameter of said flame being narrow relative to that of said second-burner but increasing in diameter at its other end to form an exhaust port connecting with an outer surface of said block, the diameter of the flame channel being designed to provide a high-velocity flow of gas therethrough,

said viewing port comprising an undercut portion extending from a surface of said block to said flame channel in a location which permits the chemiluminescent color spectrum of the burning contaminant to be viewed but is sufficiently far from the oxidizing portion of the flame in said second burner to exclude the light from the oxidizing portion from view,

said water channel extending longitudinally through said block and having an inlet and an outlet port,

a cover for said viewing port comprising a transparent pane and holding means therefor, said holding means being shaped to fit into said viewing port and to be held therein so that said flame channel can be viewed through said pane, and

an ignition device seated in said ignition chamber for igniting the gases in said first and second burners;

means connected to said hydrogen inlet port for supplying hydrogen gas thereto;

means connected to said water inlet and outlet ports for circulating water through said water channel;

exhaust means connected to said exhaust port for pulling air and hydrogen gas through said first and second burners and said flame channel; and

color detection means arranged to view the light emitted from said viewing port, said detection means being adapted to provide a signal output proportional to the difference in intensity of two colors.

3,877,820

ALTERNATING LIGHT PHOTOMETER

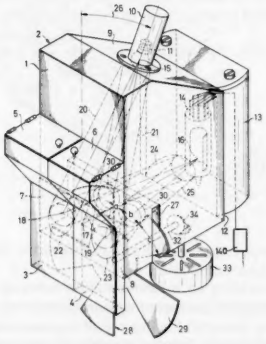
Hartmut Bock, Fischbach, Taunus; Werner Melzer, Liederbach; Helmut Schroeder, Hofheim, and Leo Schupmehl, Liederbach, all of Germany, assignors to Kalle Aktiengesellschaft, Wiesbaden-Biebrich, Germany

Filed Oct. 5, 1973, Ser. No. 403,799

Claims priority, application Germany, Oct. 5, 1972, 2248781

Int. Cl. G01n *21/22*

U.S. Cl. 356—229 **15 Claims**



1. An alternating light photometer comprising a light source, first and second measuring stations including means for holding material to be measured, first and second paths permitting illuminating light emitted by the source to reach the first and second measuring stations, said first and second

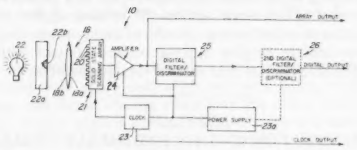
paths diverging from one another in the direction from the light source to said measuring stations, a light receiver, third and fourth paths permitting measuring light emanating from the first and second measuring stations to reach the light receiver, said third and fourth paths converging toward one another in the direction from said measuring stations to said light receiver and means permitting light emanating from the first measuring station and light emanating from the second measuring station to alternately reach the light receiver, wherein the plane joining the light source and the two measuring stations, the plane joining the light source, the first measuring station and the light receiver, the plane joining the light source, the second measuring station and the light receiver, and the plane joining the two measuring stations and the light receiver form a tetrahedron, and wherein the first and second measuring stations, the first and second paths for illuminating light, and also the third and fourth paths for measuring light are arranged in such a manner that they are mirror-symmetrical to a plane defined by the centers of the light source and the light receiver and being at a right angle with a straight line connecting corresponding points of said measuring stations.

3,877,821

APPARATUS FOR DETECTING FLAWS USING AN ARRAY OF PHOTO SENSITIVE DEVICES

Stephen E. Price, and Thiel J. Gomm, both of Salt Lake City, Utah, assignors to Inex, Inc., Denver, Colo.

Filed July 23, 1973, Ser. No. 381,549
Int. Cl. G01n *21/16, 21/32*
U.S. Cl. 356—237 **4 Claims**



1. A flaw detector comprising:
a housing;
a lens arranged in said housing;
a scanning array arranged in said housing having a plurality of photo sensitive devices associated therewith, which photo sensitive devices are positioned to receive light passing through said lens;
a source of electrical power connected to supply power to said photo sensitive devices;
means for sequentially interrogating each said photo sensitive device, each said photo sensitive device producing in said interrogation a pulse reflective of an amount of light striking thereon, which interrogation produces a train of pulses as an output from said scanning array;
amplifier means receiving said train of pulses for increasing the signal strength of said pulses; and
means for interpreting said train of pulses, comparing the amplitudes of adjacent pulses, and providing a signal output therefrom that is reflective of the differences between adjacent pulses.

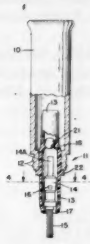
3,877,822

FOUNTAIN BRUSH

Joseph L. LaMura, West Caldwell, N.J., assignor to Joanell Laboratories, Inc., Livingston, N.J.

Filed Oct. 23, 1973, Ser. No. 408,915
Int. Cl. A46b *11/04*
U.S. Cl. 401—101 **4 Claims**

1. A fountain brush comprising: a cylindrical container closed at its lower end and defining an internal reservoir for the storage of liquids, a piston chamber secured to the upper end of the container and housing a movable brush support therein, said piston chamber formed with an opening at its upper end which permits the passage of a brush connected to the upper end of said brush support, a first annular constriction in said opening which retains the support within the chamber and forms a first valve which is opened as soon as the brush is depressed, a second valve intermediate the ends of said chamber for limiting the flow of liquid from the reservoir



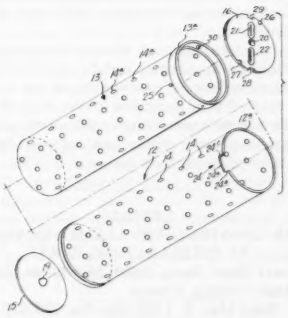
to the piston chamber when the cylindrical container is inverted, said second valve including a second annular constriction of the piston chamber and a spherical ball independently movable within the chamber, and a cylindrical extension axially mounted on the brush support for dislodging the ball to open the second valve when the container is in the inverted position and the brush is depressed a predetermined distance after opening the first valve.

3,877,823

INTERCHANGEABLE CARTRIDGE FOR FOUNTAIN PAINT ROLLERS

Ragnvald G. Leland, P. O. Box 4174, Palm Springs, Calif. 92262

Continuation of Ser. No. 238,874, March 28, 1972, abandoned. This application May 11, 1973, Ser. No. 359,604
Int. Cl. B44d *3/28*
U.S. Cl. 401—197 **10 Claims**



1. In a fountain paint roller, an interchangeable cartridge comprising:
a. an outer cylinder having a first set of apertures therein;
b. an inner cylinder having a second set of apertures therein;
c. said inner cylinder being disposed within said outer cylinder and being rotatable therewithin between a first position wherein said first and second sets of apertures are not aligned and a second position wherein said sets of apertures are aligned;
d. guide means for constraining the rotation of said inner cylinder between said first and second positions;
e. end closure means for said inner cylinder comprising means for rotating said inner cylinder between said first and second positions;

f. a tapered annular flange on said end closure means; and

g. a collar on said inner cylinder having a tapered inner surface for sealingly receiving said flange.

3,877,824

DOME HUBS FOR GEODESIC CONSTRUCTION

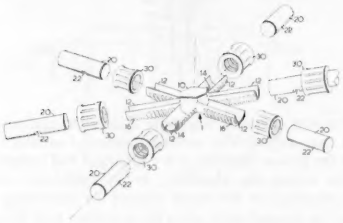
Rae Goldwin Jury, Vancouver, British Columbia, Canada, assignor to Arthur Bell, Prince George, British Columbia, Canada, a part interest

Filed Aug. 2, 1973, Ser. No. 385,120

Claims priority, application Canada, May 18, 1973, 171788

Int. Cl. E04b *7/06;* **F16b** *1/00*

U.S. Cl. 403—174 **9 Claims**



1. An improved dome joint structure for use with a building dome of the type having a large number of similar geodesic members, said joint structure including a central spider having a polygonal central portion and a plurality of radiating arms integrally formed with the central portion for receiving and holding the ends of geodesic members, in which the improvement comprises

a. each of said arms is of partial tubular configuration and has thread of serrated formations on the exterior surface thereof;

b. the interior dimensions of each said arms is substantially equal to the external dimension of the end of a geodesic members;

c. a nut is provided for each arm having thread or serrated formations on the interior surface thereof, matching the formations on the exterior surface of the arm, said nut when rotated after insertion of the end of a geodesic member into the arm serving to deform the partial tubular configuration of the arm inwardly against the end of the geodesic member to hold the same.

3,877,825

TUBULAR CONSTRUCTION ELEMENTS ASSEMBLED BY INTERLOCKING PARTS

Marcel Henri Rene Roux, Saint Martin de Brethencourt, 78660 Ablis Yvelines, France

Filed Mar. 9, 1973, Ser. No. 339,520

Claims priority, application France, Apr. 27, 1972, 72.14995

Int. Cl. E04c *2/42;* **E04f** *15/06*

U.S. Cl. 403—233 **7 Claims**

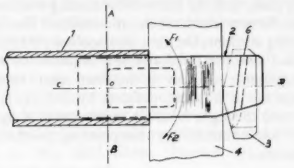
1. A joint construction for joining first and second tubular members each having opposed parallel planar side faces comprising:

a pair of gripping arms rigidly fixed to and projecting from said opposed sides at one end of said first tubular member, said arms facing each other in spaced parallel relation; the free ends of said arms being turned inwardly toward one another and being formed to define keying hooks;

said spaced arms receiving the second tubular member therebetween with one of its planar faces abutting the end of said first tubular member, between said arms;

a keying member having opposed lateral edges thereof with keying surfaces formed thereon and mating with the keying hooks of said arms and so formed that movement thereof in one direction parallel to said second tubular member causes said keying member to engage the other side face of said second tubular member and to clamp said second tubular member against the said end of said first tubular member;

each keying hook being defined by a recess located near the free end of a gripping arm, inwardly thereof, said recess being in the form of a female half-dovetail; the female half-dovetail of each keying hook being configured to



have a slight slope with respect to the second tubular member whereby to wedge said keying member against said second tubular member; the keying member cooperating with the hooks is an element having parallel lateral edges notched in the form of a male half-dovetail slidably fitted into the female half-dovetails of the hooks; the male half-dovetails of the keying member having a slope corresponding to the slope of the hooks; the face of said keying member which bears against the surface of said second tubular member having chamfered end portions and a flat intermediate portion making surface contact with said other side face of said second tubular member.

3,877,826

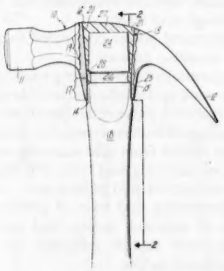
HANDLE CONNECTION FOR IMPACT TOOLS

Warren Arnold Shepherd, Jr., Warren Township, N.J., and Joseph James Guarnaccia, Wethersfield, Conn., assignors to The Stanley Works, New Britain, Conn.

Filed Mar. 12, 1973, Ser. No. 340,259

Int. Cl. B25g *3/34*

U.S. Cl. 403—267 **9 Claims**



1. An impact tool comprising a metallic head with a handle receiving eye therein having an entrance end and an exit end, said eye having a portion which progressively increases in cross-section toward the exit end, a handle having an end portion within the eye, said end portion having a shoulder portion forming a tight connection with the head over an area at the entrance end of the eye, a recessed circumferential groove adjacent said shoulder portion and spaced from the entrance end of the eye, and a wedge-free head portion spaced from the shoulder portion having a larger cross-section than

the recessed portion but a smaller cross-section than the progressively increasing cross-section of the eye to provide a clearance therebetween which extends entirely around the periphery of said head portion and which progressively increases in cross-section toward the exit end of the eye, and a tough, hard and rigid injection molded thermoplastic material in the space within the eye between the end portion of the handle and the head, said thermoplastic material tightly engaging said wedge-free head portion and said recessed portion while intimately contacting the progressively increasing eye portion to encapsulate said head portion and form a mechanical lock between the handle and the head.

3,877,827

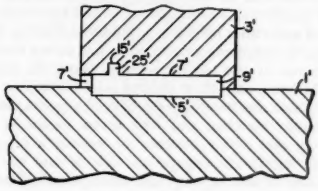
DISC RETAINER DEVICE

Richard S. Adelizzi, Newtown Square, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 304,453, Nov. 7, 1972, Pat. No. 3,822,953. This application Jan. 22, 1974, Ser. No. 435,553

Int. Cl. B60b *27/06;* **F16d** *1/06*

U.S. Cl. 403—273 **3 Claims**



1. In combination, a rotatable shaft, a disc having a bore receiving said shaft, said shaft and disc being subjected to torque and thrust loading when they are being rotated, registering axially aligned keyways in said shaft and said disc, an axially extending key fitting into said keyways for transmitting torque between said shaft and disc, said key being fitted into said shaft so as to prevent movement therebetween, said key having a dog extending radially outwardly therefrom, a circumferentially extending groove in said disc, said dog extending into said groove interlocking the shaft and disc thereby preventing relative movement of the disc with respect to the shaft.

3,877,828

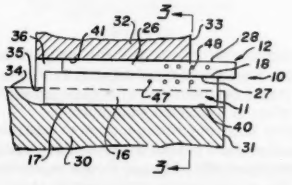
MACHINE KEY

Robert F. Smith, 3130 Traver, West Vancouver, British Columbia, Canada

Filed Aug. 6, 1973, Ser. No. 386,166

Int. Cl. F16d *1/08*

U.S. Cl. 403—358 **5 Claims**



1. A key for use in a keyway formed in the abutting faces of two machine parts one of which has an end face, said key comprising a lower wedge having a big end and a small end projecting beyond the end face, an upper wedge having a small end and a large end projecting beyond the end face, said wedges having contacting faces intially in sliding engagement with one another when the wedges are entered into the keyway from the end face, said lower and upper wedges each having a plurality of longitudinally spaced transverse holes near the small and large ends thereof respectively and which are spaced radially from said contacting faces, and a stop pin adapted to be projected through a selected one of the holes to bear against the end face, said stop pin being insertable through a selected one of the holes in the small end of the lower wedge to engage the end face and limit inward movement of said lower wedge when the upper wedge is forced into the keyway, and said stop pin being removable from the lower wedge hole and insertable through a selected one of the holes in the large end of the upper wedge to engage the end face and limit inward movement of said upper wedge when the lower wedge is driven inwardly initially to release the key from the keyway.

3,877,829

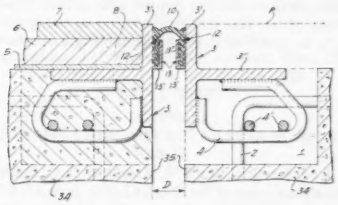
ROADWAY EXPANSION JOINT

Heinz Honegger, Wendelbuck 23, CH 8196 Wil, Switzerland

Filed Apr. 5, 1973, Ser. No. 348,187

Int. Cl. E01c *11/02*

U.S. Cl. 404—69 **7 Claims**



1. An expansion joint for a roadway, comprising two spacedly adjoining concrete slabs defining a roadway surface, a metal strip embedded in each of said slabs confronting the other slab, each of said metal strips being provided with two spaced-apart parallel walls defining respective horizontally extending but vertically elongated upwardly open grooves, and at least one flexible sealing strip of generally U-section having two downwardly extending shanks each received in one of said grooves, each shank being formed with a relatively thick central portion and with a plurality of upwardly and outwardly directed opposite resiliently deflectable bars engaging the walls of said grooves under compression and resisting upward withdrawal of said shanks from said grooves while sealing same against the entry of contaminants, said sealing strip being formed about each shank with an upwardly and outwardly curved projecting lip sealingly engaging a flank of the respective strip facing the opposite strip.

3,877,830

TOWED PAVER WITH THICKNESS AND LEVELING CONTROL

W. Thomas James, III, Canfield, Ohio, assignor to The Renner Company, Youngstown, Ohio

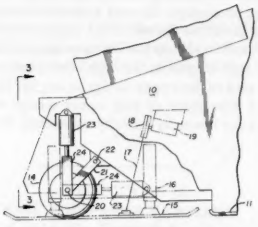
Continuation-in-part of Ser. No. 391,882, Aug. 27, 1973. This application Nov. 1, 1973, Ser. No. 411,795

Int. Cl. E01c *19/00*

U.S. Cl. 404—84 **6 Claims**

1. The combination of a towed paver and grade sensing and control means therefor, the paver comprising a hopper having front and back walls with a material depositing opening therebetween, at least two vertically adjustable supporting wheels beneath said front wall, a screed attached to the back wall of said hopper in fixed relation thereto and extending rearwardly of said material depositing opening, extendible devices be-

tween said wheels and the front wall of said hopper and a power source for said extendible devices whereby said hopper and screed may be moved relative to said wheels as said paver is towed over a surface to be paved; said sensing and control means comprising skis movably supported on said hopper and engaging said surface to be paved, means on said hopper



connected to said skis for emitting a signal, secondary means controlling said power source with respect to said extendible devices and acting responsive to said signal to move said extendible devices and the hopper and screed responsive to movement of the skis due to deviation in the grade of said surface to be paved so as to change the angle of attack of said screed.

3,877,831

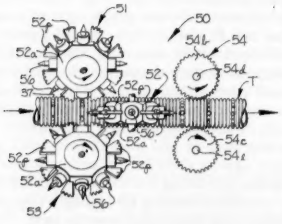
METHOD OF APPARATUS FOR DRILLING HOLES IN TUBES

Ernest J. Maroschak, Box 878, Roseboro, N.C. 28382

Continuation-in-part of Ser. No. 262,192, June 13, 1972, Pat. No. 3,819,778. This application Sept. 1, 1972, Ser. No. 285,921

Int. Cl. B23b *39/20, 41/00*

U.S. Cl. 408—32 **13 Claims**



1. Apparatus adaptable for forming holes in a corrugated tube; said apparatus comprising guide means adapted for guiding the corrugated tube forwardly in a predetermined path of travel, a plurality of spaced rotatable turret casings adjacent said guide means, said turret casings being angularly offset from each other about the path of travel of the tube, at least one of said casings being located downstream of another of said casings, a series of rotatable drill bits carried by and projecting outwardly from each respective casing and into the path of travel of the tube and adapted to drill respective holes in the tube, means for rotating said turret casings, means for rotating said drill bits on their own axes, and motive means operatively connected to said turret casings and operable for moving said casings and the respective drill bits carried thereby outwardly to an inoperative position relative to the path of travel of the tube.

3,877,832

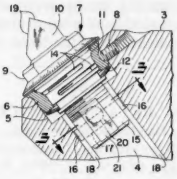
LOCKING MEANS FOR ADJUSTABLE BORING BAR INSERTS AND THE LIKE

Milton L. Benjamin, Chagrin Falls, Ohio, assignor to Erickson Tool Company, Solon, Ohio

Filed Nov. 2, 1973, Ser. No. 412,203

Int. Cl. B23b *29/02*

U.S. Cl. 408—155 **6 Claims**



1. A boring bar having a bore with at least one longitudinal keyway; a cutter member having an outer portion with cutting edges thereon and an inner portion axially slidably fitted in said bore and having a key disposed in said keyway to prevent rotation of said cutter member; a ring-like adjusting dial member having threaded engagement with said cutter member and being secured to said bar for rotation about the axis of said bore while being restrained against axial movement whereby rotation of said dial member effects axial adjusting movement of said cutter member; and lock screw means in said bar bearing on said cutter member to impose a torque force thereon to frictionally engage one side of said key with the adjacent side of said keyway; said cutter member inwardly of said dial member having a surface portion which is engaged by said lock screw means eccentrically of the axis of said cutter member and bore.

3,877,833

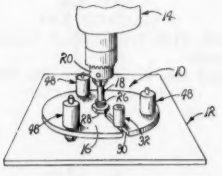
HOLE CUTTER

George E. Thornton, Athens, and Danvis T. Newby, Huntsville, both of Ala., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Sept. 19, 1973, Ser. No. 398,901

Int. Cl. B23b *51/04*

U.S. Cl. 408—186 **9 Claims**



1. An adjustable hole cutter for use in forming circular openings in workpieces comprising:

a tool mount positionable into a plane paralleling the working plane of a selected workpiece;

means for imparting rotary motion to said mount about an axis of rotation normal to the working plane;

support means affixed to said mount for resiliently supporting the mount against displacement along a linear path extended toward the workpiece as rotary motion is imparted to the mounting member;

a elongated cutting tool;

means for affixing said cutting tool to said mount in a projected relationship therewith for engaging the workpiece as the mount is displaced along the linear path;

said support means including a plurality of stabilizing struts affixed to the mount, and a plurality of spring-biased supports including strut-supporting rollable elements mounted on said struts for engaging selected portions of the surface of the workpiece.

3,877,834

SELF-PRIMING CENTRIFUGAL PUMPS

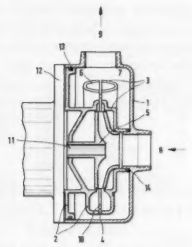
Walter Speck, and Oskar Schmidt, both of Hilpoltstein, Germany, assignors to Speck-Pumpen Daniel Speck & Sohne, Hilpoltstein, Germany

Filed Nov. 26, 1973, Ser. No. 419,149

Claims priority, application Germany, Sept. 24, 1973, 2347915

Int. Cl. F04d *5/00*

U.S. Cl. 415—53 **6 Claims**



1. In a self-priming centrifugal pump, rotary impeller means having a given axis of rotation, a central suction inlet, and an outer peripheral outlet circumferentially surrounding said axis, fluid-guiding means situated at the periphery of said impeller means and being in the form of a hollow volute means formed with an inner relatively substantially constant width axial gap circumferentially surrounding and situated directly next to the periphery of said impeller means for directly receiving fluid therefrom, the hollow interior of said volute means being substantially wider than said inner gap along substantially all of the length of said volute means with the hollow interior of said volute means extending axially in both directions beyond said inner gap of said volute means, and said volute means having an outer wall formed in a plane perpendicular to said axis and through which said outer periphery of said impeller means extends with an outer relatively narrow axial gap extending substantially through the entire length of the outer wall of said volute means and through which liquid can return toward said axis during self-priming operations, and a housing means housing said impeller means and said volute means which is formed with said outer gap in said plane, said housing means having an outlet through which fluid from said volute means is discharged while liquid can return toward said axis during self-priming operations through said gaps in said volute means.

3,877,835

HIGH AND LOW PRESSURE HYDRO TURBINE

Fred M. Siptrott, 3011 Hardies Ln., Santa Rosa, Calif. 95401

Filed July 13, 1973, Ser. No. 379,102

Int. Cl. F01d *13/00, 1/16*

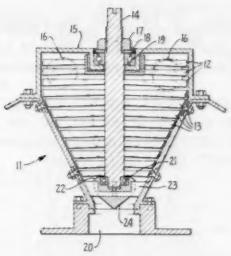
U.S. Cl. 415—143 **11 Claims**

1. A hydro-turbine having a rotatable shaft comprising,

input means formed for directing a stream of liquid at high pressure tangentially into the turbine,

a first set of radially extending vanes mounted on the shaft in position to intercept the stream of liquid from said input means for imparting impulse rotational energy to the shaft, said vanes being formed for deflecting the stream of fluid to effect a change in direction thereof from tangential to axial, and

a second set of radially extending vanes of opposite pitch angle to said first set of vanes mounted on the shaft in position to intercept the deflected stream of fluid and



formed for imparting reaction rotational energy to the shaft in the same direction of rotation as set impulse rotational energy imparted to said shaft by said first set of vanes.

3,877,836

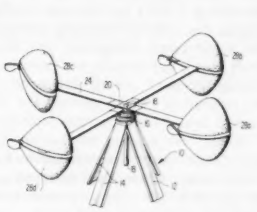
HORIZONTAL WINDMILL

Leo L. Tompkins, 127 Wacaster St., Jackson, Miss. 39209

Filed Aug. 13, 1974, Ser. No. 497,156

Int. Cl. F03d

U.S. Cl. 416—119 **6 Claims**



1. In combination; a windmill comprising;

a plurality of vertical aerodynamic sail assemblies,

sail supporting means for maintaining said sail assemblies in positions for pivoting about a vertical pivot axis for each assembly with the center of lift of each sail being slightly behind the vertical pivot axis thereof and including at least one vertical aerodynamic sail in each assembly,

means permitting said sail assemblies to move in a closed circular path,

means for additively applying the torque output of the wind acting on the sails of said sail assemblies to provide output torque for said windmill,

a trim tab pivotably mounted to said at least one sail of each sail assembly such that the trim tab is disposed downwind from the trailing edge of said one sail,

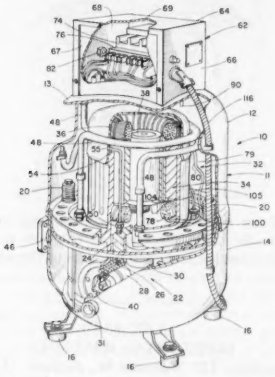
control means responsive to movement of said sail assemblies about said closed circle for automatically pivoting said trim tabs to inclined positions relative to the longitudinal axis of the sails when said sail supporting means is rotated such that the sail axis, the circular path axis and the wind direction are substantially in line such that these sails provide additive forces tending to rotate said sail supporting means in the same direction, and for maintaining the sail assemblies that are generally at right angles to the circular path axis and the wind direction in weather cocked position;

whereby, said sail assemblies provide minimum drag in comparison with their useful additive torque output.

3,877,837
COMPRESSOR CONTROL WITH THERMAL DENSITY SENSOR

Sidney A. Parker, Fort Worth, and Richard E. Cawley, Hurst, both of Tex., assignors to Lennox Industries, Inc., Fort Worth, Tex.

Filed Dec. 27, 1973, Ser. No. 428,831
Int. Cl. F04b *49/00*
U.S. Cl. 417—25 5 Claims

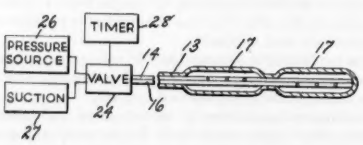


1. In a refrigerant compressor of the type having a compression mechanism within an outer casing, said compression mechanism comprising a block for defining a cylinder, a movable member inside the cylinder receiving refrigerant gas and discharging the compressed refrigerant gas through a discharge line, shaft means for moving the movable member, a motor for rotating the shaft means and control means for controlling the operation of the motor, the improvement comprising thermal densiy sensor means including a thermostat mounted on the compression mechanism responsive to the temperature of the compression mechanism for preventing the start-up of the motor when the temperature of the compression mechanism is below a predetermined value to prevent damage to the compression mechanism.

3,877,838
DEVICE FOR ADVANCING MATERIAL THROUGH A TUBE

Daniel S. J. Choy, 892 Riverbank Rd., Stamford, Conn. 06903

Filed Aug. 9, 1973, Ser. No. 387,084
Int. Cl. F04b *43/08*, *43/10*; A61b *19/00*
U.S. Cl. 417—394 8 Claims

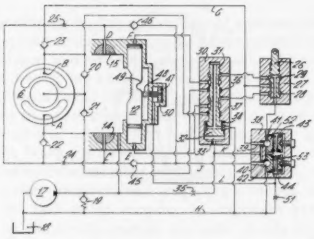


1. A device for advancing material through a tube comprising a pair of end-to-end longitudinally spaced proximal and distal longitudinally elongated inflatable members, each of said inflatable members having means permitting each of said inflatable members to expand radially at a progressively decreasing rate from the proximal to the distal portions thereof under the influence of an increase in internal pressure therein and to contract radially at a progressively decreasing rate from the distal to the proximal portions thereof with the decrease in said internal pressure, an elongated flexible shaft having a pair of lumens, each of said lumens communicating with a respective inflatable member, and means simultaneously communicating with said inflatable members through respective lumens for alternately connecting one of said members to a source of pressurized fluid and the other of said members to exhaust.

3,877,839
TORQUE LIMITING MEANS FOR VARIABLE DISPLACEMENT PUMPS

Richard Joseph Ifield, 95 Copeland Rd., Beecroft, Sidney, New South Wales, Australia (2119)

Filed Oct. 3, 1973, Ser. No. 402,973
Claims priority, application Australia, Oct. 23, 1972, 922/72
Int. Cl. F04b *49/00*
U.S. Cl. 417—217 8 Claims

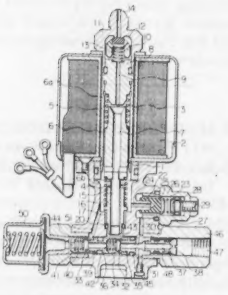


1. In a variable displacement piston pump including a driven rotor, torque limiting means, for limiting the driving torque of the pump, comprising, in combination, a hydrostatically balanced slipper bearing supporting the pump rotor, pressure responsive means operable to regulate a pump displacement, and means transmitting the hydrostatic bearing pressure to said pressure responsive means to effect operation of said pressure responsive means.

3,877,840
ELECTROMAGNETIC PLUNGER PUMP

Tadashi Nakamura, 3-7, Minamizawa 3-chome, Higashikurume-shi, Tokyo, Japan

Filed Oct. 31, 1973, Ser. No. 411,272
Claims priority, application Japan, Mar. 21, 1973, 48-39606
Int. Cl. F04b *49/10*
U.S. Cl. 417—307 4 Claims



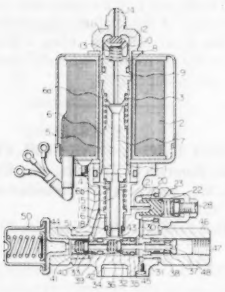
1. In a reciprocating electromagnetic pump including a cylinder, an electromagnetic plunger having a flow-passage

therethrough and defining upper and lower chambers in combination with said cylinder and slidably mounted in the cylinder, means for reciprocating the electromagnetic plunger including an electromagnetic coil coaxial to said electromagnetic plunger, a power source coupled to said electromagnetic plunger for selective activation thereof, a check valve operatively positioned in the fluid flow-passage and including a fixed valve seat and a movable valve member of magnetic material cooperating with the seat to close said passage, said movable member being so positioned as to be drawn away from its seat by the attraction of the electromagnetic coil during operation of the pump to allow fluid flow, and a pressure plunger operatively coupled to said electromagnetic plunger, the improvements comprising said pressure plunger being rigidly coupled to said electromagnetic plunger, a hollow cylinder member positioned about said pressure plunger within said cylinder, said cylinder having an inwardly stepped portion in the vicinity of said cylinder member but spaced therefrom, an elastic member positioned on said stepped portion of said cylinder and supporting said cylinder member and a spring member operatively coupled to said electromagnetic plunger and to said cylinder member, whereby said cylinder member can shift radially of said electromagnetic plunger such that friction between the plunger and the cylinder is eliminated.

3,877,841
ELECTROMAGNETIC PLUNGER PUMP

Tadashi Nakamura, 3-7, Minamizawa 3-chome, Higashikurume-shi, Tokyo, Japan

Filed Oct. 31, 1973, Ser. No. 411,270
Int. Cl. F04b *49/00, 39/08*
U.S. Cl. 417—311 **6 Claims**

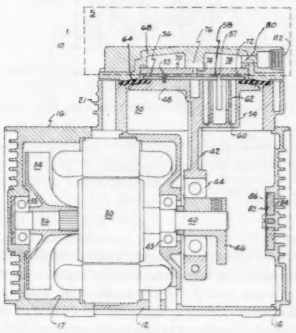


1. In a reciprocating electromagnetic pump including a cylinder, a magnetic piston having a flow passage therethrough and having inlet and outlet ends and slidably mounted in the cylinder, said cylinder defining a pumping chamber surrounding the inlet end of said piston and receiving fluid therein, means for reciprocating the piston including an electromagnetic coil coaxial to said magnetic piston, a power source coupled to said electromagnetic piston for selective activation thereof, and a check valve mounted on the piston in the fluid flow-passage, the improvements which comprise a pump body having a passageway therein, one end of said passageway being a fluid inlet, a suction side check valve and a discharge side check valve positioned within said passageway and normally biased closed, said passageway communicating with said pumping chamber in the vicinity of said suction side check valve, whereby the suction stroke of said piston opens said suction side check valve and draws fluid into said passageway, said fluid forcing open said discharge side check valve, said pumping chamber also communicating with said passageway in the region of said discharge side check valve, fluid being drawn into said pumping chamber therefrom, and a relief valve means communicating with said pumping chamber and said passageway of said pump body.

3,877,842
AIR PUMPS

Robert Raymond Greene, Chicago; Hans Oscar Jacob, Morton Grove, and Meredith Wayne Meece, Niles, all of Ill., assignors to International Telephone and Telegraph Corp., New York, N.Y.

Division of Ser. No. 4,615, Jan. 21, 1970. This application Dec. 27, 1971, Ser. No. 212,387The portion of the term of this patent subsequent to Mar. 21, 1989, has been disclaimed.
Int. Cl. F04b *21/00, 17/00*
U.S. Cl. 417—312 **4 Claims**

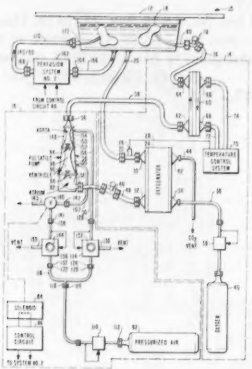


1. A motor operated air cooled pump including a pump body having disposed therein a pumping chamber, said pumping chamber having a movable pump member disposed therein, valve means for controlling the flow of air in said pumping chamber, said pump member operating with a suction stroke to draw air from a first air inlet means through a first air duct channel means into said pumping chamber and a discharge stroke to compress said air and to expel the compressed air from said pump chamber through a first air outlet means, second air inlet and outlet means separate from said first air inlet and outlet means, said second air inlet and outlet means being positioned about the surface of said pump body, said second air inlet means being connected to said second air outlet means by second air duct channel means separate from said first air duct channel means, said second air duct channel means extending through said pump body in a manner such that said second channel means extend in sequence from said second air inlet means around the outer surface of said pumping chamber over the surface of said motor and then to said second air outlet means, means for drawing cool air into said pump body through said second air inlet means and for drawing said air through said second channel means and for expelling said air from said pump body through said second air outlet means, said air circulating through said second channel means in said pump body first providing cooling of said pumping chamber and said pump member disposed therein whereby heat of compression generated by said suction and discharge strokes of said pump member is removed and then cooling the motor bearings and windings of said motor as said air is drawn over said motor surface, and dampening means positioned within said pump member for reducing noise caused by the operation of the valve during said suction stroke and said discharge stroke.

3,877,843
PULSATILE PUMPING SYSTEM

Halbert Fischel, Sherman Oaks, Calif., assignor to Baxter Laboratories, Inc., Morton Grove, Ill.

Filed May 21, 1973, Ser. No. 361,960
Int. Cl. A61b *19/00*; F15b *21/02*; F04b *43/00*
U.S. Cl. 417—394 10 Claims



1. A system for providing a selectively controllable pulsatile flow of a perfusate to simulate cardiac action comprising: a pulsatile perfusate pump which comprises flexible chamber means, said means being collapsible in response to applied fluid pressure, to pump perfusate in said chamber means through a flow line in pulsatile manner;

at least one fluid pressure means;

adjustable systolic pressure regulator means coupled to said fluid pressure means;

first conduit means including control signal responsive valving means coupling said systolic pressure regulator means to said ventricle chamber means; and

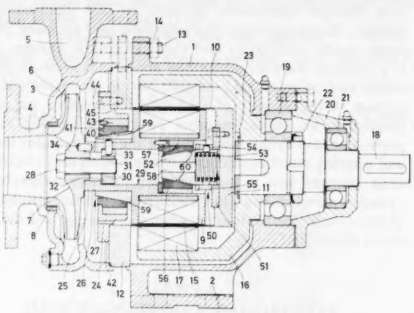
electronic control means including adjustable means for generating square wave control signals of adjustable duration and repetition rate, the square waves having sharp rise and fall times, wherein said valving means comprises a two output valve having a venting output and an output communicating with said perfusate pump, wherein said fluid pressure means comprises a pressure storage vessel, and wherein said electronic control means comprises counter means adjustable to provide valving means controlling outputs at selected counts, said counter means being adapted to count said square wave control signals.

3,877,844
PUMP

Franz Klaus, Uhlandstr. 54, 463 Bochum, and Hans E. Fichtner, Langen Donk 127, 415 Krefeld 1, both of Germany

Filed Nov. 5, 1973, Ser. No. 413,173
Claims priority, application Germany, Nov. 6, 1972, 2254265
Int. Cl. F04b *17/00, 35/04*; F16c *25/00*
U.S. Cl. 417—420 8 Claims

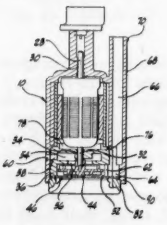
1. A pump which comprises a cup-shaped main housing, a shaft rotatably supported in the closed end of said main housing, a cup-shaped rotor in said main housing having the closed end thereof adjacent the closed end of the main housing and secured to said shaft for co-rotation, a cup-shaped inner housing projecting through the open end of said cup-shaped rotor into closely spaced relation with the closed end of said rotor and having an outturned flange around the open end thereof secured to the open end of said main housing, an inner rotor projecting through the open end of said inner cup-shaped housing into closely spaced relation with the closed end of said inner housing, a pump casing overlying the open end of said inner housing and secured to the open end of said main housing, said pump casing having an axial inlet and a circumferential outlet, a pump impeller in said pump casing having an inlet registering with the casing inlet and an outlet discharging to the casing circumferential outlet, means fixedly mounting said pump impeller on said inner rotor, a main conical bearing surrounding a portion of said inner rotor and supported by said inner housing in the open end thereof rotatably supporting said inner rotor in said inner housing, an auxiliary spring loaded conical bearing carried by the closed end of said inner housing and projecting into said inner rotor to cooperate with the main conical bearing to support the inner rotor, said inner housing hermetically sealing pump fluid from said main housing, said inner housing and said main and auxiliary bearings receiving fluid from said pump casing, and magnets carried by the inner periphery of the shaft mounted rotor and the outer periphery of the inner rotor providing a magnetic field coupling the rotors for co-rotation whereby rotation of the shaft will drive the pump impeller.



3,877,845
ELECTRIC IN-TANK FUEL PUMP

John C. Green; Heinrich E. Thausing, and Edward T. May, all of St. Louis, Mo., assignors to ACF Industries, Incorporated, New York, N.Y.

Filed June 28, 1973, Ser. No. 374,580
Int. Cl. F04b *17/00*
U.S. Cl. 417—424 7 Claims



1. A centrifugal liquid fuel pump assembly of the type enclosed in liquid fuel tanks comprising:

an elongated integral housing having a fluid-inlet end and a fluid-outlet end, wherein a portion of said housing at said fluid-inlet end forms a pump-enclosing portion of said housing and other portions of said housing form a motor-enclosing portion and an outlet column;

a motor armature mounted in said motor-enclosing portion of said housing for rotating about an armature axis, said armature including an armature shaft and a commutator;

motor stator magnets mounted in said motor-enclosing portion of said housing surrounding said armature;

motor brushes resiliently mounted by brush springs in said motor-enclosing portion of said housing to make contact with said commutator; and

a pump mounted in said pump-enclosing portion of said housing, said pump including a pump impeller mounted on said armature shaft for rotation therewith, said pump having an inlet port and an outlet port;

wherein said pump portion of said housing has a tear-drop shape in a plane perpendicular to said armature so as to define a salient housing portion which includes a salient passage and wherein said pump outlet port communicates with said housing salient passage; and

wherein said outlet column extends parallel to said armature axis and defines a main outlet passage which communicates with said salient passage.

3,877,846

VARIABLE CAPACITY SCREW COMPRESSOR

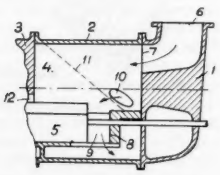
Anders Lundberg, Norrkoping, Sweden, assignor to Stal-Refrigeration AB, Norrkoping, Sweden

Filed Aug. 15, 1973, Ser. No. 388,600

Claims priority, application Sweden, Aug. 28, 1972, 11092/72

Int. Cl. F01c *1/16*; **F04c** *17/12*; **F04b** *23/00*

U.S. Cl. 417—440 **4 Claims**



1. A variable capacity screw compressor comprising:

a. a casing, housing two intersecting bores defining a working chamber in which a pair of intermeshing screws having helical lands and intervening grooves are mounted to rotate and compress a working fluid as it is being passed axially through said working chamber from a low pressure inlet wall to a high pressure outlet wall, said walls being located at opposite axial ends of said casing;

b. an inlet passage in said inlet wall located in substantially axial alignment with the axes of said screws for admitting working fluid into the ends of the grooves facing said inlet passage as they become exposed during rotation;

c. a slide valve comprising a portion of the casing located on the high pressure side of said working chamber and being axially displaceable therein in response to varying load conditions;

d. said slide valve being effective to expose a by-pass opening in said working chamber to a degree corresponding to the axial displacement of the slide valve to vent partially compressed air from the working chamber;

e. means for passing said vented partially compressed working fluid directly into the grooves of said screws at a location between said by-pass opening and said axially aligned inlet passage whereby to interrupt admission of low pressure working fluid.

3,877,847

CONCRETE PUMP

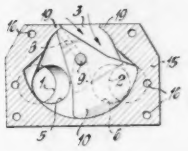
Heinz Bille, Dortmund-Hombruch, Germany, assignor to Firma Walter Scheele KG, Unna-Massen, Germany

Filed Oct. 4, 1973, Ser. No. 403,598

Claims priority, application Germany, Oct. 5, 1972, 2248868

Int. Cl. F04b *15/02, 39/10*

U.S. Cl. 417—532 **5 Claims**



1. A concrete pump comprising:

a hollow housing having at least two passageways formed therein, and an input opening communicative to each of said passageways;

a cylinder coupled to one end of each of said passageways;

a piston slidably disposed in each of said cylinders for compressive movement therein;

a drive shaft rotatably disposed in said housing and coupled to each of said pistons;

a funnel-shaped closure secured over the opposite end of said passageways defining the output of said housing, said closure having a pivot bearing for pivotably securing one end of said drive shaft;

a pear-shaped blocking plate pivotably disposed for movement over the output member of said housing for alternately closing at least one of said passageways, and opening at least one of said passageways communicative to a cylinder under compression; and

a sliding valve plate axially connected to said drive shaft for alternately opening and closing the input opening to each of said passageways, said sliding valve plate being connected to said blocking plate so as to cover and seal the input opening of a passageway under compression, said sliding valve plate being moveable over the entire width of the input opening of the passageways, wherein said funnelshaped closure additionally includes a first rib extending between the output of said passageways and a second pair of ribs connected to said first rib and defining the pivot angle of said sliding valve plate.

3,877,848

ROTARY ENGINE

Edward L. Solem, 3211 Euclid Heights Blvd., Cleveland Heights, Ohio 44118

Filed Dec. 5, 1973, Ser. No. 421,851

Int. Cl. F01c *1/02*

U.S. Cl. 418—61 A **5 Claims**

1. A rotary engine comprising

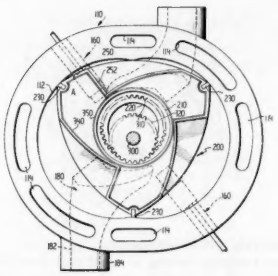
a. a stator block defining a trochoidal chamber, said stator block having closed ends, said ends defining at least one propellant linear slot gas inlet of adjustable size and at least one corresponding gas outlet, disposed in operative relation to the said linear slot gas inlet;

b. a trilobe rotor sealed within the trochoidal chamber between the ends thereof, said rotor containing centrally disposed means to impart rotation to a drive shaft, said rotor defining at least one propellant gas channel upon at least one end face thereof, said propellant gas channel being of planar obtuse triangular vertical section, with curvalinear trailing edges defined by the channel, and a leading edge of the channel being substantially parallel to the radius of the rotor, per se, the said channel being

disposed in fluid flow relation to the respective gas inlet and gas outlet;

c. a drive shaft having a cam engageable with the trilobe rotor, the shaft bearing in ends of the trochoidal chamber; and

d. a source of propellant gas connected to the propellant gas inlet wherein by rotor operation, the gas channel of the



rotor and gas inlets of the stator respectively define opposed gas expansion and contraction confines, whereupon by movement of the rotor propellant gas is admitted through said gas inlet and said gas channel and a gradual expansion of the propellant occurs and is applied to the drive shaft cam by movement of the rotor about the trochoidal chamber.

3,877,849

CONSTRUCTION OF ROTOR FOR ROTARY MECHANISMS

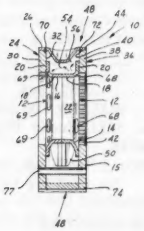
Werner Wieland, Obereisesheim, Germany, assignor to Audi NSU Auto Union Aktiengesellschaft, Neckarsulm and Wamkel G.m.b.H., Lindau, Bodensee, both of Germany

Filed Dec. 10, 1973, Ser. No. 423,159

Claims priority, application Germany, Dec. 21, 1972, 2262619

Int. Cl. F01c *1/02*; **F04c** *17/02*; **B23p** *15/10*

U.S. Cl. 418—61 A **13 Claims**



3. A rotor having a plurality of contiguous flank portions disposed for eccentric rotation within and relative to a housing cavity partially defined by a trochoidal peripheral surface, the rotor comprising:

a. a bearing hub having opposite end portions lying in planes normal to the axis of the bearing hub;

b. two substantially congruent side wall elements disposed on opposite sides of said bearing hub and lying in substantially parallel planes;

c. a plurality of flank elements interconnecting the peripheral edge portions of said two side wall elements and arranged in endwise alignment;

d. said bearing hub being dimensioned to extend between and engage said side wall elements at the end portions;

e. each side wall element has a plurality of peripheral edge surfaces which converge to define a plurality of apex portions;

f. a solid bar for each pair of apex portions disposed to extend between the apex portion of one side wall element to the corresponding apex portion of the other side wall element to thereby interconnect the side wall elements and to provide material in which recesses can be provided for receiving apex seal devices; and

g. said bearing hub, side wall elements and flank elements each being constructed of cut and formed sheet metal material and secured together and to said solid bars into a unitary structure.

3,877,850

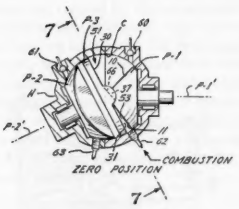
SPHERICAL POWER DEVICE

Samuel M. Berry, Dallas, Tex., assignor to Commercial Metals Company, Dallas, Tex.

Filed Apr. 23, 1973, Ser. No. 353,557

Int. Cl. F01c *3/00*

U.S. Cl. 418—68 **6 Claims**



1. A fluid handling device having a plurality of variable volume chambers for use as a pump, compressor or motor comprising:

a. a housing having a cavity therein, at least a portion of which has a substantially spherical configuration;

b. a pair of end pistons disposed in said spherical cavity;

c. each of said end pistons being mounted for rotation in said spherical cavity about an axis of rotation;

d. the axis of rotation of each of said pair of end pistons being disposed at an angle other than 180° with respect to the other axis of rotation;

e. each of said pair of end pistons having a pair of faces inclined axially inwardly toward the center of said spherical cavity;

f. first semi-cylindrical journal means in each of said pair of pistons extending diametrically of said spherical cavity;

g. a central piston disposed in said spherical cavity between said pair of end pistons and extending diametrically of said spherical chamber;

h. said central piston having second semi-cylindrical journal means on opposite sides thereof for operably connecting said first semi-cylindrical journal means of each said pair of end pistons and a pair of piston faces on each side of said second journal means aligned with said inclined piston surfaces to form a plurality of chambers in said spherical cavity whereby said central piston is simultaneously oscillated as it rotates with said pairs of pistons to vary the volume of said plurality of chambers.

3,877,851
ROTARY COMPRESSOR WITH INTEGRALLY CONNECTED, DIAMETRICALLY ALIGNED VANES

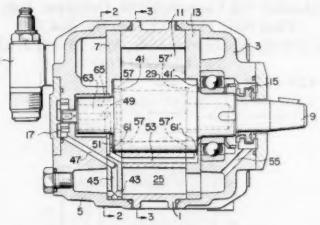
Sanpei Komiya, 1745-1 Ohaza Shimo-koizumi, Ohizumi-machi, and Takeo Saito, 1926-3 Ohaza Shinozuka, Ohra-machi, both of Ohra-gun, Gumma-ken, Japan

Filed Feb. 4, 1974, Ser. No. 439,281

Claims priority, application Japan, Feb. 16, 1973, 48-18372; Mar. 1, 1973, 48-23687; May 22, 1973, 48-59469

Int. Cl. F01c *21/04;* **F04c** *29/02;* **F01c** *1/00*

U.S. Cl. 418—76 **2 Claims**



1. A rotary compressor comprising, a unitary one-piece vane, a cylinder having a bore, a hollow rotor eccentrically mounted for rotation within said cylinder bore including two diametrically opposed slots, said vane being slidably received in said slots, a valve plate and a side plate respectively mounted on opposite ends of the cylinder adjacent opposite ends of the rotor, an oil pump for circulating lubricating oil in the compressor, wherein said rotor includes a hollow internal cavity, said diametrically opposed slots of the rotor are formed over the entire axial length of the rotor so as to open into said cavity except for end portions of the slots, and said valve and side plates each include inwardly facing central cylindrical recesses defined by an end wall and a peripheral cylindrical wall which recesses matingly receive the opposite ends of the rotor and oil injection openings connected to conduit means extending from said oil pump and extending into said central recesses adjacent the peripheral walls thereof whereby oil reservoirs are wholly contained within said central recesses, said oil reservoirs being defined by the peripheral wall of the recess, end surface of the vane, and side and bottom walls of said slots so that said reservoirs are placed in communication with said oil injection openings once during each revolution of said rotor to effect the supply of oil into the oil reservoirs by the oil pump.

3,877,852
ROTARY ENGINE DRAIN PUMP ARRANGEMENT

Paul J. Louzecky, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 27, 1974, Ser. No. 446,312

Int. Cl. F01c *21/04;* **F04c** *29/02*

U.S. Cl. 418—88 **3 Claims**

1. A rotary engine comprising an engine housing having internal walls cooperatively defining a cavity, a crankshaft extending through said cavity and rotatably supported by said housing, said crankshaft having an eccentric located in said cavity, a rotor rotatably mounted on said eccentric in said cavity, a rotary phasing gear concentric with said eccentric fixed to one side of said rotor, a stationary phasing gear concentric with said crankshaft fixed to said housing and meshing with said rotary phasing gear, said rotor cooperating with said walls of said housing to provide a plurality of chambers that are spaced about and move with said rotor while varying in volume as said rotor and said crankshaft rotate, oil supply passage means for supplying oil to lubricate parts of said engine including said phasing gears and also to the interior of said rotor for cooling, oil drain passage means for draining the oil from the parts that are lubricated and cooled, and drain pump means for pumping oil away from said phasing gears and toward said oil drain passage means comprising a pumping hole through said eccentric, said pumping hole having an inlet

at the phasing gear side of said eccentric and an outlet at the other side of said eccentric that trails said inlet relative to the direction of rotation so that the inertia of the oil acts to pump oil away from said phasing gears.

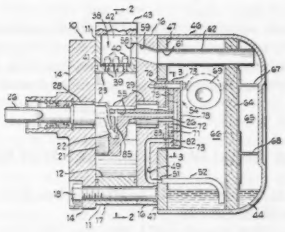
3,877,853
VANE CONTROLLING SYSTEM FOR ROTARY SLIDING VANE COMPRESSOR

Lester E. Harlin, York, Pa., assignor to Borg-Warner Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 160,694, July 8, 1971, abandoned. This application Aug. 14, 1973, Ser. No. 388,307

Int. Cl. F01c *21/04;* **F04c** *27/02, 29/04*

U.S. Cl. 418—88 **5 Claims**



1. A rotary sliding vane compressor comprising:

a casing defining a closed cavity having a cylindrical wall and a pair of spaced parallel end walls;

a slotted rotor eccentrically positioned within said cavity to define with said cylindrical wall and said end walls a crescent-shaped compression chamber, and having a drive shaft journalled in said end walls;

a plurality of vanes slidably mounted in the slots of said rotor;

suction and discharge ports communicating with said compression chamber;

and a lubricating system including an oil reservoir which supplies oil to an oil pump which then delivers pressurized oil into said slots behind said vanes to urge said vanes toward and in sealed engagement with said cylindrical wall when said drive shaft is driven, thereby to compress a gaseous fluid introduced through said suction port and to discharge that fluid through said discharge port at a higher pressure,

the inlet of said oil pump communicating with said oil reservoir via an oil supply passageway sized to create cavitation in an amount which increases as drive shaft speed increases thereby controlling the oil pressure delivered to said slots so that the total force, as contributed by both the oil pressure and by centrifugal action, holding each of

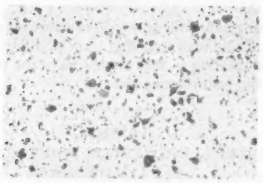
said vanes against said cylindrical wall is maintained within desired limits as the drive speed changes.

3,877,854

RELATIVE COMBINATION OF APEX SEAL AND ROTOR HOUSING IN ROTARY PISTON INTERNAL COMBUSTION ENGINE

Takao Sasame, Hiroshima, and Kentaro Takahashi, Omiya, both of Japan, assignors to Nippon Piston Ring Co., Ltd., Tokyo, Japan

Filed Sept. 10, 1973, Ser. No. 395,874
Claims priority, application Japan, Sept. 12, 1972, 47-90912
Int. Cl. F01c *21/00*
U.S. Cl. 418—178 **1 Claim**



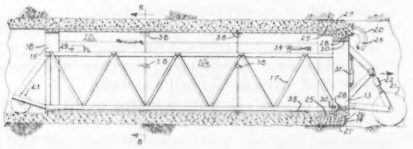
1. A relative combination of an apex seal and a rotor housing in a rotary piston internal combustion engine wherein said apex seal is made of ferrous or nonferrous metal and is provided with a sprayed layer of Fe—O compound, which contains oxygen in the range from 15.0 to 30.05 wt.%, having the thickness of more than 0.1 mm and said rotor housing is provided with a cast-iron member of which graphite is precipitated on the surface thereof in the range from 1 to 15 %, by area, based on the surface area of said cast-iron member, at least on the apex seal sliding surface of said rotor housing.

3,877,855

SLIPFORM WITH LONGITUDINALLY MOVABLE FORM SECTIONS

Raymond A. Hanson, c/o R. A. Hanson Co., P.O. Box 7400, Spokane, Wash. 99207

Filed May 4, 1973, Ser. No. 357,453
Int. Cl. E03f *3/06*
U.S. Cl. 425—59 **12 Claims**



1. A slipform for smoothing the exposed surfacing material placed upon a prepared soil surface during longitudinal movement of the slipform along the surface, comprising:

a plurality of partial form sections arranged adjacent to one another having outer surface areas complementary to the desired surface configuration, adjacent form sections each being longitudinally slidable on said surfacing material relative to the remaining form sections;

supply means for placement of surfacing material in a plastic state along the prepared soil surface forward of the form sections;

and individually operable power means connecting the form sections to one another for selectively imparting longitudinal sliding motion to one form section along said surfacing material relative to the other form sections and relative to the placed surfacing material;

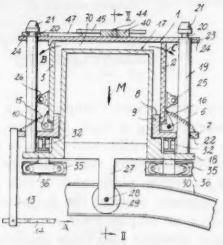
said individually operable power means comprising independent power assemblies located along the sides of the form sections at inner surfaces thereof, each power assembly being operatively connected between two of said form sections so as to impart relative sliding movement between them when actuated.

3,877,856

MOLD FOR HOLDING CONTAINER SHELLS DURING INTRODUCTION OF INSULATION THEREBETWEEN

Mario Valentini, Via Cappuccini 38, Gallarate, Italy

Filed Nov. 17, 1972, Ser. No. 304,589
Claims priority, application Italy, Apr. 13, 1972, 23098/72
Int. Cl. B29f *1/06*
U.S. Cl. 425—110 **6 Claims**



1. In a mold for holding a pair of container shells while a foam plastic is received therebetween, plate means formed with an opening, inner mold means situated in said opening, moving means operatively connected to said plate means for moving the latter together with said inner mold means along a predetermined path, displacing means operatively connected with said inner mold means for responding to movement of the latter with said plate means to diplace said inner mold means through said opening of said plate means between an outer release position and an inner molding position, where said inner mold means is received in the interior of an inner container shell, outer mold means carried by said plate means for movement with respect thereto between a closed position surrounding an outer container shell to hold the latter properly positioned with respect to an inner shell which receives said inner mold means and an open position releasing the container shells and a foam plastic therebetween for separation from the mold, and automatic means operatively connected with said inner mold means and engaging said outer mold means for responding to movement of said inner mold means from said outer release position to said inner molding position thereof to automatically move said outer mold means from its open position to its closed position, said automatic means including posts operatively connected with said inner mold means for movement therewith and said outer mold means including walls swingably connected with said plate means and acted upon by said posts to be moved thereby from said open to said closed position.

3,877,857

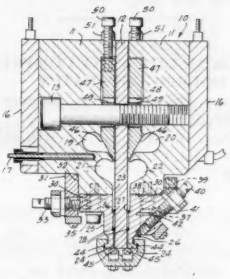
MULTIPLE MELT CHAMBER EXTRUSION DIE

James J. Mekead, Roscoe, Ill., assignor to Beloit Corporation, Beloit, Wis.

Filed Dec. 20, 1972, Ser. No. 316,863
Int. Cl. B29d *7/04*
U.S. Cl. 425—133.5 **9 Claims**

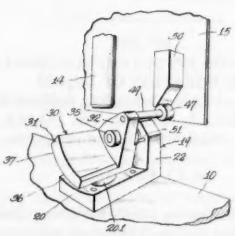
1. In a multiple melt chamber film extrusion die,

an elongated die body split along its longitudinal center, and having two die halves,
a center divider extending between said die halves,
at least two melt chambers in said die body extending on each side of said center divider and opening to said divider,
gap control members slidably guided along opposite sides of said center divider and having lips defining the inner walls of the innermost of said melt chambers adjacent said center divider,



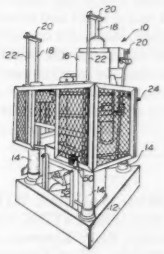
means for adjusting said gap control members to define exit passageways leading from said melt chambers of preselected widths in accordance with the thickness of the film to be extruded from said melt chamber, and
die lips adjustably secured to said die body and cooperating with said center divider to define melt flow passageways leading from said melt chambers along each side of said divider, and to provide exit slots for the extrusion of dual films of plastic material.

3,877,858
SAFETY MECHANISM
Roger S. Smith, Burton, Ohio, assignor to Newbury Industries, Inc., Newbury, Ohio
Filed May 28, 1974, Ser. No. 473,934
Int. Cl. B29f *1/00*
U.S. Cl. 425—152 **10 Claims**



1. Safety mechanism for a machine having a pair of plates, each adapted to mount one of a pair of complementary members for performing a work operation, said plates being movable toward and away from each other to respectively bring said complementary members to operative and inoperative positions, said mechanism comprising:
a safety gate movable from one position wherein it blocks accessibility to said plates and members, to another position wherein it permits such accessibility,
a bracket connected to one of said plates, having an opening therein,
a post connected to the other of said plates, and extending therefrom, the end of the post extending into said opening when said complementary members are in operative position, and removed from said opening when said complementary members are in inoperative position,
a guard movably carried by said bracket and urged to position to cover said opening and thereby prevent said post end from entering said opening, whereby said complementary members are prevented from being moved to operative position,
and means movable with said safety gate and operable to move said guard to a position clear of said opening when said safety gate has been moved to said one position.

3,877,859
SAFETY PROTECTION STRUCTURE FOR MOLDING MACHINE
William Grazine, Piscataway, N.J., assignor to Farrell Patent Company, Dunellen, N.J.
Filed Sept. 12, 1973, Ser. No. 396,519
Int. Cl. B29c *5/06*
U.S. Cl. 425—152 **20 Claims**

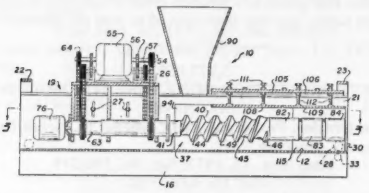


16. A molding machine for making plastic articles or the like including a mold having a first part support from the machine, a second mold part movable along a predetermined path toward and from the first part to close and open the mold, a motor-operated ram for moving the second mold part toward and from the first part, a fixed frame of the machine with a bearing in which the ram moves to actuate the second mold part of the mold toward and from the first part, an arm extending from the fixed frame, bearing means on the fixed frame and supporting the arm and about which the arm is angularly movable, the arm having an interference extending from it across a surface of the second mold part that faces the first part of the mold and in the path of movement of the second part of the mold when the mold is moving toward closed position, the arm and interference being of sufficient strength to stop the movement of the ram, a movable safety gate associated with said molding machine, and means mounted on said safety gate for moving the arm and interference out of interfering position when the mold is to be closed.

3,877,860
EXTRUSION MACHINE FOR MAKING ARTICLES OF CEMENT-LIKE MATERIAL
George Putti, North Vancouver, British Columbia, Canada, assignor to Dyform Concrete Prestressed Ltd., Vancouver, British Columbia, Canada
Division of Ser. No. 882,039, Dec. 4, 1969, abandoned. This application Sept. 3, 1970, Ser. No. 69,300
Claims priority, application Canada, June 11, 1970, 85194
Int. Cl. B28b *21/14*
U.S. Cl. 425—380 **23 Claims**

1. In an extrusion machine including a mold for making elongated articles of concrete-like moldable material by forcing the material through said mold, said machine including means for feeding said moldable material to said mold, said machine being moved forwardly by reaction as the material is forced against the molded portion of the article, said machine including means for guiding the forward motion of said ma-

chine along a path for forming the molded material as an elongate body in said path, the improvement which comprises: a rotatable spiral conveyor in and extending longitudinally of the mold for moving the material under pressure through the mold and against material that has set into the cross-sectional shape dictated by the cross-sectional shape of the mold, said conveyor including a spiral flight along its length and a forming element of non-circular cross-sectional shape immediately



following the down-stream end of the spiral conveyor at the downstream end of said spiral flight and mounted so as not to be rotated by the conveyor, means for controlling the rotation of said forming element relative to the rotation of said conveyor, said conveyor moving the material under pressure over the forming element whereby said element forms a core of said predetermined cross-sectional shape in the article as it is being formed.

3,877,861

BLOW MOULDING MACHINE WITH CAM CONTROLLED RECIPROCATING CARRIAGE

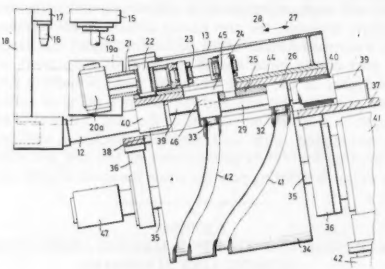
Erich Kiefer, Bonn-Holzlar; Peter Klusener, Bad Godesberg, and Dieter Hagen, Widdig, all of Germany, assignors to Kautex-Werke Reinold Hagen GmbH, Bonn-Holzlar, Germany

Filed Jan. 30, 1973, Ser. No. 327,910

Claims priority, application Germany, Jan. 31, 1972, 2204395

Int. Cl. B29d *23/03*

U.S. Cl. 425—387 B **11 Claims**



1. In an apparatus for blow moulding hollow bodies, in particular bottles, containers or the like from thermoplastic synthetic material, having a two piece hollow sectional mould movable between an open and closed position, a first station wherein the synthetic material is extruded into the closed mould and a second station laterally adjacent to said first station wherein the synthetic material is released from the open mould after means for expanding the synthetic material has been brought into contact with the closed mold, the improved means to open and close said mould and to move said mould between said first and second stations comprising:

a. reciprocating carriage slidingly affixed to a stationary base structure,

b. mechanical linkage means attaching each mould piece to said reciprocating carriage such that the mould is movable between an open and closed position,

c. means attached to said mechanical linkage to move said mould between said open and closed positions,

d. means to move said reciprocating carriage linearly between said first and second stations comprising a drive roller having a cam surface about its periphery, said cam surface being engaged by a follower attached to said carriage such that rotation of said drive roller causes said carriage to reciprocate, and

e. means to rotate said drive roller.

3,877,862

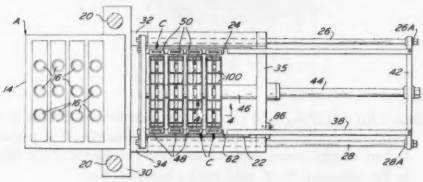
FEEDER FOR MULTI-CAVITY COMPRESSION MOLDING APPARATUS

Paul Francis Murray, Philadelphia, Pa., assignor to Pennwalt Corporation, Philadelphia, Pa.

Filed Nov. 16, 1973, Ser. No. 416,465

Int. Cl. B29c *3/04*

U.S. Cl. 425—448 **5 Claims**



1. Apparatus for feeding preformed masses of plastic material into multi-cavity compression molding presses, comprising:

a frame,

a plurality of horizontally spaced troughs rotatably supported in said frame,

means for compartmentalizing said troughs in correspondence with the mold cavities,

means for reciprocating said frame from a loading position in which the preformed masses are dispensed into said troughs to a discharging position in which the troughs are located over the mold cavities, and

means for rotating said troughs through 180° to dump the preformed masses into the mold cavities when said frame is in the discharging position.

3,877,863

APPARATUS FOR EFFECTING CONTROLLABLE VAPORIZATION OF LIQUID

Robert Noel Penny, 12 Aldenbrook Rd., Solihull, England

Filed Mar. 22, 1973, Ser. No. 343,653

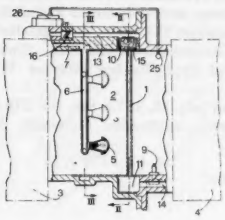
Claims priority, application United Kingdom, Mar. 22, 1972, 13299/72

Int. Cl. F23n *5/02*

U.S. Cl. 431—75 **6 Claims**

1. Apparatus for effecting controllable vaporization of vaporific liquid fuel in a stream of hot air or other oxidant flowing through a duct comprising flameholding means positioned in the duct and extending transversely of the flow path therethrough of the stream of oxidant to create a region of reduced pressure in which vaporized fuel can be ignited and will burn in the stream of oxidant, means defining a region externally of said duct, the flame-holding means comprising a heat exchanger communicating with said external region, means for passing a stream of air through said external region at a temperature lower than said heat exchanger positioned in the duct, whereby heat transfer will occur along the flame-holding means to said external region at a rate dependent upon the temperature sensed downstream of said heat exchanger by a temperature sensor and valve means controlled by said temperature sensor to vary the rate of flow of air through said

external region and hence the rate of heat transfer and the rate of vaporization of fuel in the duct, the apparatus also including



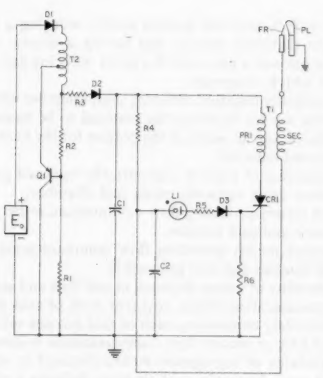
means for introducing liquid fuel into the region of reduced pressure and ignition means positioned downstream of said flameholding means.

3,877,864

SPARK IGNITER SYSTEM FOR GAS APPLIANCE PILOT IGNITION

Elmer A. Carlson, Agoura, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed July 29, 1974, Ser. No. 492,459
Int. Cl. F23q *3/00*
U.S. Cl. 431—264 **8 Claims**



1. A spark pilot igniter for gaseous and vaporous fuel systems including a fuel operated pilot, said igniter including a spark gap adjacent to said pilot, said igniter being operative from a low voltage first direct current power source, comprising:

a ringing choke oscillator connected to said first direct current power source for producing a second direct current voltage source higher than said power source;

charging means including a first capacitor and a series resistance, said first capacitor being connected to charge from said second direct current voltage source;

a first solid state switch device having main current carrying electrodes including an anode and a cathode and a control electrode capable of controlling the effective resistance between said anode and cathode from a relatively low to a relatively high value;

a high ratio step-up transformer having primary and secondary windings, said primary winding being connected in series with said main current carrying electrodes of said first solid state switch device and said second direct current voltage source, said secondary winding being operatively connected to said spark gap;

a relaxation oscillator connected to said second voltage source for producing periodic output voltage pulses, said voltage pulses being connected to said first solid state switching device control electrode to cause said resistance between said anode and cathode to assume said low effective resistance value momentarily, thereby to produce a pulse of current in said transformer primary and a corresponding stepped-up voltage applied to said spark gap contemporaneously with the occurrence of said relaxation oscillator output pulses thereby to effect ignition of said pilot;

means including a flame rod extending at least partially into the flame of said pilot, said flame rod being connected to provide a flame current path through said flame from a terminal of said transformer secondary;

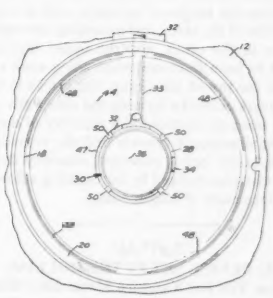
and a return current path for the other terminal of said transformer secondary connected to a point in the circuit of said relaxation oscillator such that said flame current reduces the effective supply voltage to said relaxation oscillator below the point of operability of said relaxation oscillator.

3,877,865

GAS BURNER AND AERATION PAN ASSEMBLY

Donald E. Duperow, Detroit, Mich., assignor to Lincoln Brass Works, Inc., Detroit, Mich.

Continuation of Ser. No. 307,079, Nov. 16, 1972, abandoned.
This application May 2, 1974, Ser. No. 466,144
Int. Cl. F24c *3/00*; **F23d** *13/36*
U.S. Cl. 431—349 **8 Claims**



1. In an assembly of a gas burner disposed within a central opening in an aeration pan, the opening having a diameter greater than that of the burner to provide a clearance through which a flow of secondary air is furnished to the burner ports, the pan having a bottom with portions proximal to the burner which define said opening and portions distal of the burner which adjoin a generally vertical side wall, improved structure wherein,

said clearance is smaller than that required to pass adequate secondary air to the burner ports under at least certain conditions of operation of the burner,

said pan bottom extending upwardly from said distal portions to said proximal portions along a slope directed toward the burner ports,

said side wall being provided with aperture means above the level of said distal portions to admit a supplementary flow of secondary air into said aeration pan,

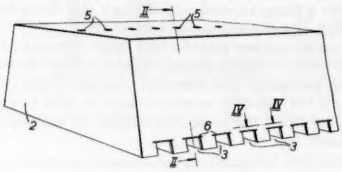
said sloped bottom being positioned and contoured to guide said supplementary secondary air upwardly and inwardly for delivery to flames issuing from said burner ports,

said flow through said clearance and said supplementary flow being cooperable to provide adequate secondary air to said burner ports under substantially all conditions of operation of said burner.

3,877,866
METHOD AND APPARATUS FOR THE MANUFACTURE OF BRICKS

Patrick Allen Laker, Rudgwick, England, assignor to Rudgwick Brickworks Company Limited, Rudgwick, Sussex, England

Filed Nov. 12, 1973, Ser. No. 415,180
Claims priority, application United Kingdom, Nov. 20, 1972, 53596/72; Jan. 23, 1973, 3494/73
Int. Cl. F27b *17/00*
U.S. Cl. 432—6 **4 Claims**

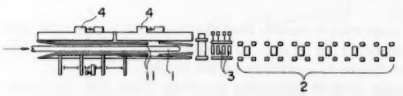


1. A brick clamp for the firing of green bricks constructed wholly of bricks to be fired, said clamp consisting of a stack of green bricks arranged in layers with the bottom layer of bricks being in direct contact with a non-combustible supporting supporting surface and a casing structure of close-set casing bricks encasing the sides and top of the stack of green bricks, the lower layers of green bricks being stacked so as to form a plurality of tunnels having side walls and a top wall and a height less than the height of the stack, said tunnels running along the bottom of the stack and extending through the stack from one side to the other, and the upper layers of bricks being stacked to form flues communicating each tunnel with an aperture in the top of the clamp, the bricks in at least the two bottom layers of bricks forming the side walls of adjacent tunnels being open-set to provide a plurality of ducts extending between said adjacent tunnels and the remainder of the stacked green bricks being close-set, whereby the clamp of bricks can be completely fired by introducing a flow of ignited gas or vapor into each of said tunnels.

3,877,867
HEATING DEVICE SET IN THE ROLLING MILL

Kenji Tsuchiya; Yoji Ito; Yasuhiro Matsushita; Hideshi Tsuji, and Tomohisa Sasaki, all of Osaka, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Mar. 18, 1974, Ser. No. 452,342
Claims priority, application Japan, June 18, 1973, 48-67720; June 22, 1973, 48-70636; June 22, 1973, 48-70637; July 30, 1973, 48-86018; Aug. 11, 1973, 48-90320
Int. Cl. F27b *9/28*
U.S. Cl. 432—45 **10 Claims**

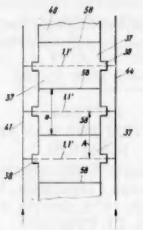


1. In a heating device used in a rolling mill for heating edge portions of rolled materials traveling through said rolling mill and specifically positioned along a steel sheet hot rolling line comprised of a series of roughing rolling mills and finishing rolling mills, the improvements which comprise a pair of side guides positioned along said hot rolling line for guiding said rolled materials, said side guides being movable mounted for movement in a direction perpendicular to the direction of travel of said rolled materials, and a plurality of burners positioned on both of said side guides and adapted for heating edge portions of said rolled materials.

3,877,868
SHAFT FURNACE FOR TREATING PELLETIZED MATERIALS

Werner Wenzel; Friedrich H. Franke, both of Aachen; Horst Konig, Duisburg, and Mohammed Meraikib, Aachen, all of Germany, assignors to Demag Aktiengesellschaft, Duisburg; Rheinische Braunkohlenwerke AG, Cologne, both of Germany and Prof. Dr.-Ing. Werner Wenzel, Aachen, Germany

Filed July 13, 1973, Ser. No. 378,890
Claims priority, application Germany, July 15, 1972, 2234847
Int. Cl. F27b *1/16*
U.S. Cl. 432—98 **3 Claims**



1. A shaft furnace for heating and/or reducing a charge of pelletized materials therein and having a source of heated reducing gas and a gas outlet for spent reducing gas; the combination which comprises

a. a vertically disposed reducing shaft chamber with an inlet at the top for receiving the material to be heated and/or reduced and an outlet at the bottom for the heated and/or reduced material;
b. a plurality of pairs of diametrically opposed gas nozzles spaced apart vertically along said chamber;
c. first means providing flow communication between said source and said nozzles;
d. second means providing flow communication between said nozzles and said gas outlet;
e. a plurality of valves disposed in said first and second flow communication means adjacent each of said nozzles for alternately connecting each of said nozzles selectively to said first or second flow communication means; and
f. a plurality of segregation means disposed in said charge and spaced apart in said chamber defining a plurality of zones of pelletized material of increasingly heated and reduced condition and constructed to descend with said charge;
g. whereby selectively opening and closing said pairs of valves introduces reducing gas radially of the direction of movement of said pelletized material in said zones in alternating reverse radial directions from said first to said second flow communication means, and vice versa and counter-currently of movement of said pelletized material.

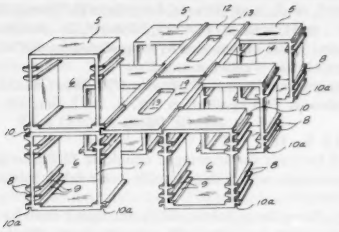
3,877,869
MODULAR SUPPORT FOR CARRYING CERAMIC PRODUCTS DURING BAKING

Ferdinando Palazzo, Marghera, Italy, assignor to S.I.R.M.A. Societa Italiana Refrattari Marghera Azionaria S.p.A., Venice, Italy

Filed Dec. 10, 1973, Ser. No. 423,632
Claims priority, application Italy, Jan. 5, 1973, 67007/73
Int. Cl. F27b *21/04*
U.S. Cl. 432—258 **6 Claims**

1. A support for holding ceramic products during baking, comprising:

a. a plurality of open-ended rectangular cases each having a top wall, a bottom wall, and two vertical side walls,



b. a series of vertically spaced apart horizontal teeth projecting from each of the inner and outer faces of each of said side walls,

c. each of the extreme upper and lower teeth of each outer series of teeth being profiled to define, together with an extreme tooth of a similar case stacked above or below its case, respectively, a partially enclosed horizontally extending cavity,

d. a plate-like connector element having two parallel side edges, the end portion of each of said edges being profiled to be accommodated by one of said cavities and not removable from said cavity by relative movement between said connector element and the teeth defining said cavity in a direction perpendicular to the side walls of the cases carrying said teeth, so that said connector element can maintain a predetermined spacing between two cases arranged side-by-side, and

e. an enlargement carried by each connector element side edge between the two end portions of that side edge, said enlargement being profiled so that it cannot be accommodated by one of said cavities, whereby said enlargement can maintain a horizontal spacing between two successive horizontally aligned cases which are engaged by said connector element.

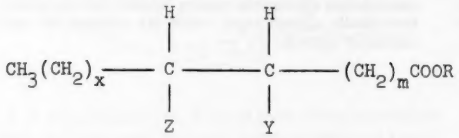
3,877,870

USE OF SOLID CARRIER FOR DYEING HYDROPHOBIC FIBERS

Kurt A. Dellian, Spring Valley; Marvin Weiskopf, Bronx, both of N.Y., and Samuel Lee, Fairlawn, N.J., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 215,097, Jan. 3, 1972, Pat. No. 3,820,952.
This application Jan. 4, 1974, Ser. No. 431,008
Int. Cl. C09b *67/00*
U.S. Cl. 8—92 5 Claims

1. A carrier composition useful in coloring synthetic hydrophobic fibers containing 10 to 92 parts by weight of a carrier selected from the group consisting of o-phenylphenol, biphenyl phenyl benzoate, phenyl salicylate, naphthalene and mixtures thereof which is solid to a temperature of at least 45°C and 8 to 90 parts by weight of a compound of the formula:



wherein:
x is an integer from 5 to 8;
m is an integer from 5 to 8;
Z is SO_3H or OSO_3H;
Y is H, OH, SO_3H, or OSO_3H; and
R is C_nH_{2n+1} and *n* is an integer from 1 to 5.

3,877,871

PROCESS FOR RENDERING WOOL NON-FELTING

Heinz Abel, Reinach/Baselland, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

Continuation of Ser. No. 86,632, Nov. 3, 1970, abandoned.
This application Oct. 10, 1972, Ser. No. 296,473
Claims priority, application Switzerland, Nov. 10, 1969, 16657/69
Int. Cl. D06m *15/36, 15/60*
U.S. Cl. 8—127.6 16 Claims

1. A process for rendering wool non-felting, comprising the steps of immersing the wool in an aqueous exhaustion bath which consists essentially of a water solution of 0.1 to 2% by weight, relative to the weight of the wool to be treated, of dichloroisocyanuric acid or of an alkali metal salt thereof, and thereafter treating the wool in an exhaustion bath with an aqueous solution of 0.5 to 5% by weight relative to the weight of the wool to be treated of a synthetic resin, at a temperature of 35° to 100°C, wherein the synthetic resin is the reaction product (a), (b) or (c), wherein (a) is the reaction product of a basic polyamide with an epoxide, or with an alkyl ether of an aminoplast precondensate, or with an epoxide-amino-plast-alkyl ether reaction product; (b) is a reaction product of an epoxide with an amine-epoxide reaction product; and (c) is the reaction product of an epoxide-polycarboxylic acid with an amine or with an amine-epoxide reaction product, the epoxide reactant in each case being a low molecular weight reaction product of a bisphenol with epichlorohydrin.

3,877,872

PROCESS FOR IMPROVING ABRASION RESISTANCE OF RESILIENT FABRICS AND THE PRODUCT PRODUCED

Sidney L. Vail, New Orleans, La.; Alvin H. Young, New York, N.Y., and Gerald B. Verburg, Metairie, La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Continuation-in-part of Ser. No. 772,386, Oct. 31, 1968, abandoned. This application Oct. 6, 1972, Ser. No. 295,778
Int. Cl. D06m *1/00*
U.S. Cl. 8—183 4 Claims

1. A process for treating a cellulosic fabric to produce a commercially acceptable durable-press fabric which process consists of:

a. padding the cellulosic fabric through a resin bath at a pH of about 2 which bath contains from about 10 to 20 weight percent of a methylated methylolmelamine, from about 5 to 20 weight percent of a crosslinking agent selected from a group consisting of N,N-dimethylol carbamates and N,N′-dimethylol dihydroxyethyleneurea and from about 10 to 20 weight percent of tetraethylene glycol dimethyl ether,

b. heating the padded cellulosic fabric in an open state at a temperature of about 58° C. for a period of about 3 minutes to permit unrestrained evaporation of moisture from said fabric and, without any further heating, then neutralizing, washing and drying the cellulosic fabric,

c. padding the washed and dried cellulosic fabric from step (b) with an aqueous solution free of crosslinking agent and containing from about 0.5 to 4.0 weight percent of an acid catalyst selected from a group consisting of magnesium chloride hexahydrate and zinc nitrate hexahydrate and from about 0 to 2 weight percent of emulsified polyethylene,

d. drying the cellulosic fabric from step (c) for a period of about 7 minutes at a temperature of about 60° C., and

(e) curing the fabric from step (d) for a period from about 3 to 5 minutes at a temperature of about 160° C.

3,877,873

TEST FOR METABOLIC CONDITIONS IN BLOOD OR SERUM

Milton Winitz, Rt. 9, Box 12A, Milton, Fla. 32570

Filed June 26, 1972, Ser. No. 266,087
Int. Cl. G01n *33/16*
U.S. Cl. 23—230 B 8 Claims

1. A colorimetric method for determining the metabolic disease states: granulocytic leukemia, lymphocytic leukemia, monocytic leukemia, primitive white cell leukemia, lymphosarcoma, Hodgkin's disease, sickle-cell anemia or trait, respiratory acidosis, metabolic acidosis, hypoglycemia and hyperglycemia, which comprises forming at least one dilute solution of whole blood or blood serum in dilute saline in the presence of gentian violet, and comparing the color produced to a standard.

3,877,874

METHOD FOR DETECTION AND DROPLET MEASUREMENT OF S-(2-DIISOPROPYLAMINOETHYL)O-ETHYL METHYLPHOSPHONOTHIOATE CHEMICAL WARFARE AGENT WITH 1,3,5 TRINITROBENZENE

Howard E. Thompson, Dugway, Utah, and Frank M. Noonan, Morgantown, W. Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 17, 1969, Ser. No. 867,423
Int. Cl. G01n *31/22*
U.S. Cl. 23—230 M **3 Claims**

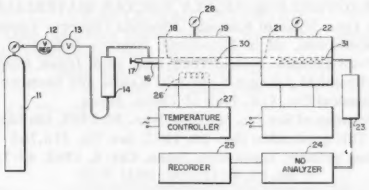
1. A method for the detection and droplet measurement of S-(2-diisopropylaminoethyl)O-ethyl methylphosphonothioate chemical warfare agent comprising the treatment of a paper card stock with a solution of 1,3,5-trinitriobenzene dissolved in a solvent selected from the group consisting of methanol, ethanol, water, benzene, acetic acid, dimethylsulfoxide, acetic anhydride and mixtures thereof, drying the sensitized paper, contacting the dried sensitized paper with the agent and photographing the paper card stock for evaluation.

3,877,875

NITROGEN CONSTITUENT ANALYSIS

Robert H. Jones, Fullerton, and Michael B. Johnston, Anaheim, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed July 19, 1973, Ser. No. 380,740
Int. Cl. G01n *25/22*
U.S. Cl. 23—230 PC **72 Claims**



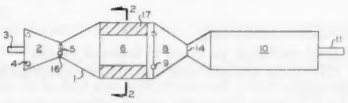
1. An analyzer for nitrogen comprising in combination:
means for receiving nitrogen-containing substance and converting nitrogen content to oxides,
means for receiving such oxides and reducing the nitrogen oxides to nitric oxide, and
a nitric oxide analyzer arranged to receive nitric oxide from said reducing means.

3,877,876

CARBON BLACK APPARATUS

Paul J. Cheng, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 30, 1972, Ser. No. 284,702
Int. Cl. C09c *1/50, 1/48*
U.S. Cl. 23—259.5 **4 Claims**



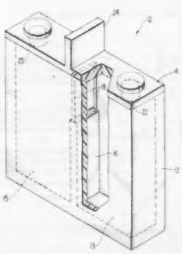
1. A longitudinally disposed tubular carbon black reactor comprising:
a. a preheating section, the interior of which has the shape of a venturi;
b. a first mixing section comprising a restriction portion in open axial communication with said preheating section;
c. a combustion section in open axial communication with said first mixing section;
d. a second mixing section in open axial communication with said combustion section, said second mixing section having a decreased diameter compared to said combustion section;
e. a reaction section in axial and open communication with said second mixing section;
f. first means connected to the preheating section for the introduction of hydrocarbon feed into said preheating section;
g. second means connected to said preheating section for tangential introduction of fuel-rich hot combustion gases into said preheating section;
h. third means connected to said combustion section for tangential introduction of oxygen-rich hot combustion gases into said combustion section; and
i. fourth means connected to said reaction section for withdrawal of the carbon black formed from the reactor.

3,877,877

PLASTIC CELL FOR MIXING TWO LIQUIDS OR A LIQUID AND A SOLID

Edward J. Prosen, Rockville, Md., assignor to The United States of America as represented by the Secretary of Commerce, Washington, D.C.

Filed Oct. 31, 1973, Ser. No. 411,539
Int. Cl. B01l *3/00;* **G01k** *17/00;* **B01f** *5/00*
U.S. Cl. 23—259 **8 Claims**



1. A cell for use as a miniature reaction vessel comprising:
an enclosed container having top, bottom and side walls; and
a barrier means separating said container into two compartments, said barrier means extending upwardly from said bottom wall, sealingly engaging said sidewalls and terminating short of said top wall leaving an opening between said barrier means and said top wall;
wherein all of the surfaces on the interior of said container are made of a hydrophilic substance except for a ring of hydrophobic material extending around the perimeter of said opening.

3,877,878

ANALYTIC DEVICE AND METHOD FOR MONITORING HEAVY METALS IN NATURAL WATERS

William B. Kerfoot, and Ralph F. Vaccaro, both of Woods Hole Oceanographic Institution, Woods Hole, Mass. 02543

Filed May 2, 1973, Ser. No. 356,375
Int. Cl. G01n *31/06, 33/18*
U.S. Cl. 23—253 TP **23 Claims**

1. An analytical device for monitoring the presence of heavy metals in natural waters subject to sources of pollution, comprising in combination:
first and second sheets of porous material and a layer of porous adsorptive material sandwiched between said first and second sheets;

sealing means joining said first and second sheets in completely surrounding relation to said layer of adsorptive material whereby the natural water may reach said layer only by passage through at least one of said first and second sheets; and

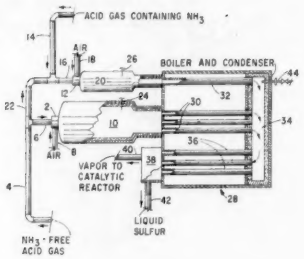
said layer of adsorptive material consisting of activated charcoal impregnated with an organic agent having two functional groups, one of which groups is an aromatic nucleus which adsorbs readily on said activated charcoal and the other of which groups binds ions of at least one selected heavy metal which is to be monitored.

3,877,879

APPARATUS FOR HANDLING AMMONIA-CONTAINING ACID GAS STREAMS

John W. Palm, and Kay L. Berry, both of Tulsa, Okla., assignors to Amoco Production Company, Tulsa, Okla.

Filed Feb. 26, 1973, Ser. No. 335,615
Int. Cl. C01b *17/04;* **F23n** *3/00, 5/00*
U.S. Cl. 23—262 **6 Claims**



1. In an apparatus for the preparation of elemental sulfur from gases containing H_2S and NH_3, the improvement comprising the combination of two separate combustion chambers of different size in parallel, separate means for injection of air and of ammonia-containing H_2S into the smaller of said chambers and separate means for injecting an NH_3-free stream of H_2S and of air into the other of said chambers, means for sampling the products of combustion from the smaller of said chambers, means for determining the H_2S/SO_2 ratio in the sample, means for regulating the air to said smaller chamber based on the H_2S/SO_2 ratio determined, and an enclosed vessel having a boiler section into which said chambers discharge.

3,877,880

CRYSTAL MELTING APPARATUS FASHIONED TO ELIMINATE BUBBLES ENTRAPPED IN THE MELT

Wilhelm Kuhlmann-Schafer, Bohmerstrasse 4, Hannover, Germany

Filed July 21, 1972, Ser. No. 273,738
Claims priority, application Germany, July 31, 1971, 2138359
Int. Cl. B01d *9/00*
U.S. Cl. 23—273 SP **7 Claims**

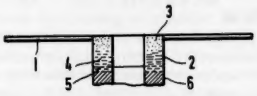
1. An apparatus for zone melting a substance comprising in combination:

a substantially planar, strip member having an opening therethrough;

side walls extending transversely from said strip member and enclosing said opening;

a sieve member secured to said side walls, said side walls and sieve member defining a pot-shaped cavity for receipt of said substance; and

means for passing a current through said strip member, side walls and sieve member to resistantly heat said side walls and sieve member, said side walls, sieve member and



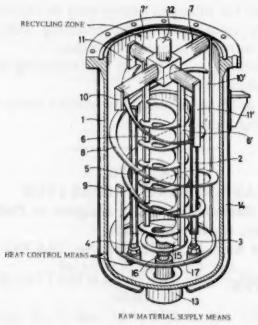
current-passing means cooperating to define means for conductively heating said substance to produce a zone of molten substance within said pot-shaped cavity, said substance being in direct physical contact with said side walls and sieve member, said molten substance passing through said sieve member and said pot-shaped cavity to be subsequently solidified, whereby gas bubbles in said zone are permitted to move upwardly to substantially avoid the entrapment of said bubbles in said subsequently solidified substance.

3,877,881

REACTORS FOR HIGHLY VISCOUS MATERIALS

Kaoru Ono; Masashi Kamada; Hiroyuki Ohisuru; Yoshikazy Wakabayashi, all of Hiroshima; Shotaro Nakamura, and Tadashi Yamada, both of Tokuyama, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha and Idemitsu Petrochemical Co., Ltd., both of Tokyo, Japan

Continuation of Ser. No. 862,230, Sept. 30, 1969, abandoned.
This application Dec. 20, 1972, Ser. No. 316,765
Claims priority, application Japan, Oct. 8, 1968, 43-73420
Int. Cl. B01j *3/00;* **B01f** *7/16*
U.S. Cl. 23—285 **1 Claim**



1. A reactor comprising:

A. a heat exchange jacketed cylindrical vessel;

B. a cylindrical draught tube mounted concentrically within the vessel;

C. an upper shaft rotatably mounted on an axis concentric to the axis of the vessel and the draught tube;

D. four arms fixedly mounted on the lower end of the upper shaft and extending radially therefrom;

E. two inner downwardly extending strips with their upper ends attached to two of said arms, the thickness of the strips being less than the width of the strips, the strips leading with their smaller side in the direction of rotation,

the outer surface of said strips being positioned just inside the inside wall of the draught tube;

F. a transverse member fixedly attached to the bottom of each inner downwardly extending strip;

G. a lower shaft fixedly attached to the transverse member and rotatably mounted on the same axis as the upper shaft;

H. a first helical screw having the outside diameter slightly smaller than the inside diameter of the draught tube, being internally fixedly attached to the inner downwardly extending strips;

I. four outer downwardly extending strips, the upper ends of which being attached to the ends of said arms by their width leading with their smaller side in the direction of rotation the thickness of the strips being less than the width of the strips, the lower ends of said four strips being positioned just inside the interor wall of the vessel;

J. a second helical screw, the outside edge of which being just inside the interior wall of the vessel and its inside edge being just outside the outer wall of the draught tube, said second helical screwing being integrally fixed attached to all four strips at each intersection of said second helical screw with a strip; and

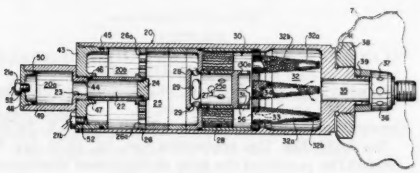
K. a third helical screw, the outside edges of which being just inside the interior wall of the vessel and its inside edge just outside the outer wall of the draught tube, said third helical screw being integrally fixed attached to all four strips at each intersection of said third helical screw with a strip, the convolutions of said third helical screw lying within the convolutions of said second helical screw.

3,877,882

GAS GENERATING DEVICE

Lee Lette, and Paul Andre, both of Mesa, Ariz., assignors to Talley Industries, Inc., Mesa, Ariz.

Filed July 27, 1972, Ser. No. 275,637
Int. Cl. B01j *7/00*
U.S. Cl. 23—281 **9 Claims**



1. A gas generating device comprising:

a. a housing;

b. a pair of chambers within said housing,

1. one of said chambers providing at least one combustor compartment, each said combustor compartment containing a reactable gas generating material, and

2. the other of said chambers providing a plenum chamber including a plurality of inter-communicating sub-chambers;

c. means within each said combustor compartment for initiating reaction of the reactable gas generating material;

d. wall means supported by said housing separating said chambers;

e. inlet means formed in said wall means communicating a flow including gas and particulate phase from each said combustor compartment into a sub-compartment of said other chamber;

f. outlet means formed in said housing, said outlet means disposed in communication with the last of said inter-communicating sub-compartments;

g. deflection means within said plenum chamber for acting upon said flow both to cool said gas phase and to trap a portion of said particulate phase, said deflection means supported by said housing between said inlet and outlet means for causing said flow during movment through said inter-communicating sub-chambers toward said outlet to undergo a plurality of substantially common changes in direction, each change in direction being at least 90°, and each change introducing turbulence to said flow resulting in cooling of said gas phase and trapping of particulate from said particulate phase;

h. filter means including at least one plurality of screen members of varying size poromesh construction arranged in successive layers of decreasing mesh size; and,

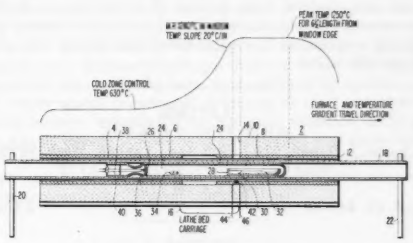
i. means mounting said screen members in one of said inter-communicating sub-chambers in the path of said flow and with said decreasing mesh size in the direction toward said outlet to complete substantially trapping of said particulate phase so that only said cooled gas phase passes from said outlet.

3,877,883

METHOD OF GROWING SINGLE CRYSTALS OF COMPOUNDS

Samuel Berkman, Florham Park, N.J., and Philip Michael Britt, Manheim, Pa., assignors to RCA Corporation, Princeton, N.J.

Filed July 13, 1973, Ser. No. 378,818
Int. Cl. B01j *17/20*
U.S. Cl. 23—301 SP **3 Claims**



1. In a method of growing a single crystal of a III–V compound, one element of which is relatively volatile with respect to another element of the compound, by maintaining a seed crystal of the compound in contact with a melt of the compound within a sealed chamber disposed within a furnace and progressively moving a hot zone relative to said seed and said melt, away from said seed, and in which a quantity of said relatively volatile element is maintained within said sealed chamber adjacent said melt but at a lower mean temperature than that of said melt such that a part of said relatively volatile element becomes vaporized and such that an atmosphere of said relatively volatile element is maintained over said melt, the step of continuously cycling the temperature of said quantity of said volatile element after it has become vaporized, around said mean temperature within a range between −1° to +1°C and −5° to +5°C, thereby cycling the pressure of said atmosphere, the period of said cycling being about 10 to 30 minutes.

3,877,884

DISPERSION STRENGTHENED ALUMINUM BEARING MATERIAL

Takeshi Tawarada, Fuji; Shigeru Okaniwa, Kanbaramachi; Katsuo Nagahashi, Fuji, all of Japan, assignors to Nippon Light Metal Research Laboratory Ltd., Tokyo, Toyo Kogyo Co., Ltd., Hiroshima Prefecture, both of Japan

Filed Oct. 30, 1972, Ser. No. 301,845
Claims priority, application Japan, Oct. 29, 1971, 46-85602
Int. Cl. C22c *21/00*; B22f *3/00*
U.S. Cl. 29—182.5 2 Claims

1. A light-weight wear-resistant composite material consisting essentially of a solid metallic matrix of aluminum or an aluminum-base alloy and dispersed in said matrix finely divided discrete particles of a non-metallic wear-resistant inorganic ceramic material, the amount of said inorganic particles being sufficient to occupy in excess of 50% of the total volume of the composite material, and the amount of said metal being sufficient to form a solid continuous phase, said particles being constituted by a generally uniform mixture of coarse particles having a diameter of about 20–100μ and fine particles having a diameter of about 0.5 to 9μ in a ratio by volume about 1.5–4:1.

3,877,885

COPPER-CLAD ALUMINUM WIRE AND METHOD OF MAKING

Peter Sexton, Attleboro, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 2, 1970, Ser. No. 94,541
Int. Cl. B32b *15/02*; B21c *37/04*
U.S. Cl. 29—197 8 Claims

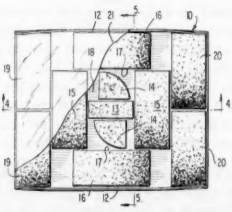
1. A copper-clad aluminum wire comprising an aluminum core having a copper cladding metallurgically bonded to said core, said cladding being formed of electrolytic tough pitch copper which is substantially free of particles of copper oxide having a maximum transverse dimension greater than about 0.000190 inches.

3,877,886

SOLID FUEL PACKAGE

Charles J. Dalzell, 920 N. 6th Ave., Yakima, Wash. 98902

Filed May 4, 1973, Ser. No. 357,172
Int. Cl. C10l *11/00*
U.S. Cl. 44—40 2 Claims



1. A substantially totally consumable solid fuel package for home fireplaces, orchard heating and the like comprising a burnable tray-like holder for solid fuel having a generally flat bottom adapted to rest on a fireplace floor or the like and having upstanding fuel-confining side wall portions, an array of compressed wood particle fuel log slices of substantially equal size disposed in said holder and having their peripheral faces resting on the bottom wall of the holder and their end faces disposed vertically, said array of fuel log slices including a first spaced opposing pair of slices located centrally in the holder and a second spaced opposing pair of slices located immediately on opposite sides of the first pair, the interior end faces of said pairs of slices being substantially at right angles and the interior end faces of said second pair being close to the peripheral faces of the first pair, whereby the interior end faces of both said pairs of slices define a top opening substantially rectangular chimney passage extending upwardly from the bottom wall of said holder, a solid igniter element disposed centrally in said chimney passage and extending substantially between said first pair of log slices and resting on the bottom wall of said holder and extending substantially to the top of said package, said top being defined by the tops of said equal size log slices, a pair of relatively small and shallow solid fuel kindling elements disposed in the bottom of the chimney passage on opposite sides of the igniter element and being in close proximity to the interior end faces of said first and second pairs of log slices to enable initial burning to migrate outwardly from the center of the fuel package near the bottom thereof, additional fuel log slices arranged on opposite sides of the first and second pairs in said array of log slices and having exterior vertical end faces terminating at the opposite ends of said package, the interior end faces of the last-named slices substantially abutting the exterior end faces of said first pair of slices, and a snug wrapping of burnable film enclosing the entire package including said holder.

3,877,887

MOTOR FUEL COMPOSITION

Fred W. Moore, Fishkill, and Herbert E. Vermillion, Wappingers Falls, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Mar. 6, 1969, Ser. No. 804,978
Int. Cl. C10l *1/10*
U.S. Cl. 44—58 8 Claims

1. A motor fuel composition comprising a mixture of hydrocarbons in the gasoline boiling range containing from about 0.03 to 1.0 volume percent of a highly refined paraffinic oil fraction of lubricating oil quality consisting of 60 to 100 percent of paraffinic hydrocarbons and less than 7 percent of aromatic hydrocarbons, said fraction having an average molecular weight in range of 600 to 800 and a 50 percent distillation point in a range of 950° to 1100°F

3,877,888

MIDDLE DISTILLATE

Alexander Gaydasch, Chicago, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 17,860, March 9, 1970, Pat. No. 3,681,038. This application Nov. 16, 1970, Ser. No. 90,068The portion of the term of this patent subsequent to Aug. 1, 1989, has been disclaimed.
Int. Cl. C10l *1/18*
U.S. Cl. 44—66 10 Claims

1. Middle distillate of improved pour point containing in combination therewith a pour point depressant concentration of the amidization reaction product of N,N-dialkylamine having 16 to 18 carbon atoms in each alkyl and hydroxy-containing carboxylic acid in which hydroxyl group is attached to the terminal carbon atom, said carboxylic acid having 2 to 22 carbon atoms.

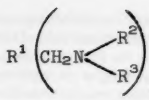
3,877,889

LIQUID HYDROCARBON FUELS CONTAINING MANNICH BASES OR DERIVATIVES THEREOF

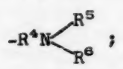
Robert Wayne Dix, Menter-on-the-Lake, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Filed Nov. 7, 1973, Ser. No. 413,488
Int. Cl. C10l *1/22*, *1/18*
U.S. Cl. 44—73 11 Claims

1. A composition comprising a major amount of a liquid hydrocarbon fuel and, dissolved or substantially stably dispersed therein, a minor amount sufficient to improve dispersancy, anti-icing or rust inhibiting properties thereof of at least one compound of the formula



wherein R^1 is a mono- or polyhydroxy-substituted aromatic, alkyl-aromatic or (substituted alkyl)aromatic radical; R^2 is hydrogen or a lower alkyl or hydroxy-substituted lower alkyl radical; R^3 is a hydroxy-substituted lower alkyl radical or



R^4 is a lower alkylene radical; R^5 is hydrogen or a lower alkyl or hydroxy-substituted lower alkyl radical; R^6 is a hydroxy-substituted lower alkyl radical; and x is the valence of R^1; with the proviso that the substituents on said substituted radicals do not alter significantly their character or reactivity.

3,877,890
BIOCIDE

Roy Frederick Maisey, Alderley Park, and Michael Singer, Manchester, both of England, assignors to Imperial Chemical Industries Limited, London, England

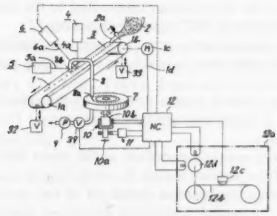
Filed Aug. 9, 1973, Ser. No. 386,877
Claims priority, application United Kingdom, Aug. 11, 1972, 37546/72
Int. Cl. C10l *1/30*
U.S. Cl. 44—76 **8 Claims**

1. A method for protecting a [medium against]hydrocarbon subject to infection by micro-organisms which comprises contacting the hydrocarbon with an effective amount of an organoboron composition obtained by the reaction between approximately equimolecular quantities of glycerol and phenyl boron oxide with elimination of a molecule of water.

3,877,891
METHOD OF ORIENTING ABRASIVE PARTICLES IN MAKING ABRASIVE ARTICLES

Kiyoshi Inoue, No. 16-8 3-chome, Kamiyoga, Setagayaku, Tokyo, Japan

Division of Ser. No. 168,092, Aug. 2, 1971, Pat. No. 3,759,383. This application May 23, 1973, Ser. No. 363,118
Int. Cl. B24d *17/00*
U.S. Cl. 51—293 **7 Claims**

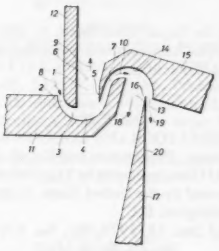


1. A method of mounting abrasive crystal particles on a support therefor, comprising the steps of:
   advancing a succession of particles along a predetermined transport path;
   scanning said particles with a beam of energy affected by the crystalline orientation of said particles;
   detecting a modification of the scanning energy indicative of the existence of a predetermined particle orientation of selected particles along said transport path; and
   selectively removing particles from said path with said orientation and carrying the removed particles away from said path in a positionally oriented manner into a bonding engagement with said support, while continuing to advance nonremoved particles with other orientations along said path.

3,877,892
SEPARATION OF FLUID SUBSTANCES

Peter Bley, Spock; Wolfgang Ehrfeld, Ettlingen, and Gerd Eisenbeiss, Karlsruhe, all of Germany, assignors to Gesellschaft fur Kernforschung m.b.H., Karlsruhe, Germany

Filed Sept. 6, 1973, Ser. No. 394,846
Claims priority, application Germany, Sept. 6, 1972, 2245730
Int. Cl. B01d *59/00*
U.S. Cl. 55—17 **6 Claims**



1. In a method for separating a gaseous or vaporous mixture into components having respectively different molecular weights and/or gas kinetic cross sections by causing the mixture to flow through a nozzle-type opening where it forms an expanded stream and by dividing the stream into partial streams by a skimmer diaphragm disposed in the flow path, the partial streams having respectively different compositions, the improvement comprising: deflecting at least one of the partial streams immediately beyond such skimmer, utilizing the kinetic energy contained in that stream; and subjecting such deflected stream to the action of a further skimmer diaphragm to divide that stream into further partial streams having respectively different compositions.

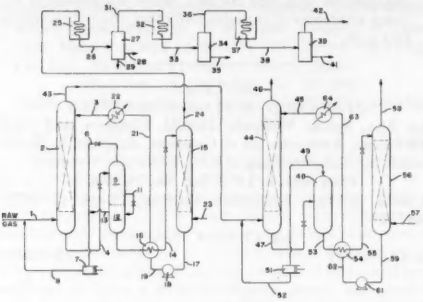
3,877,893
ABSORPTION AND SEPARATION OF NORMALLY LIQUID GAS CONTAMINANTS

John W. Sweny, River Vale, and Frank C. Burkhard, Jr., Boonton, both of N.J., assignors to Allied Chemical Corporation, New York, N.Y.

Filed May 10, 1973, Ser. No. 359,033
Int. Cl. B01d *53/14*
U.S. Cl. 55—48 **13 Claims**

1. The process for treating a combustible synthesis gas mixture derived from fossil fuels by carbonization, cracking, partial combustion or water gas reaction containing acid gas selected from the group consisting of hydrogen sulfide and carbon dioxide to remove minor amounts in the gas mixture of normally liquid contaminants selected from the group consisting of non-acidic sulfur compounds and hydrogen cyanide which comprises:
   a. passing a dialkyl ether of a polyethylene glycol solvent having 1–8 carbon atoms in each alkyl group and 3–8 ethylene units in intimate contact with the gas mixture in an absorption zone to effect absorption of at least a major portion of the normally liquid contaminants;
   b. passing the solvent containing absorbed normally liquid contaminants together with some dissolved acid gas to a volatilization zone to vaporize the normally liquid contaminants and acid gases from the solvents;

c. cooling the mixture of vapors of normally liquid contaminants and acid gas vaporized from the solvent to effect condensation of the normally liquid contaminants;



d. collecting the liquid condensate to effect separation of normally liquid contaminants from the acid gas; and

e. discharging the acid gas.

3,877,894

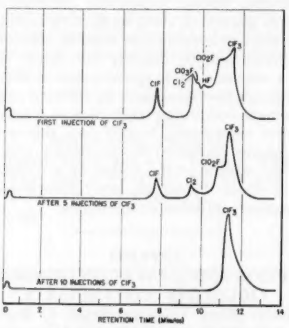
GAS CHROMATOGRAPH COLUMN MATERIAL

Lawrence G. Swope, Chillicothe, and Emory A. Smith, Portsmouth, both of Ohio, assignors to The United States of America as represented by the United States Atomic Energy Commission, Washington, D.C.

Filed Jan. 18, 1974, Ser. No. 434,725

Int. Cl. B01d *15/08*

U.S. Cl. 55—67 **8 Claims**



5. In a method of separating gas mixtures wherein said mixtures are passed through a packed column to achieve separation; the improvement comprising packing said column with fluorinated graphite, said fluorinated graphite being $(CFx)_n$ where $0.5 < x < 1.14$ and n is an integer.

3,877,895

METHOD AND APPARATUS FOR REMOVING WATER VAPOR FROM HIGH PRESSURE STEAM LINES

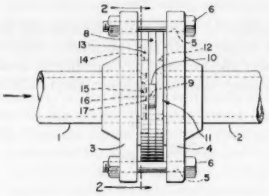
Harry J. Wonderland, Lakehurst, N.J., and Lawrence L. Guzick, Silver Spring, Md., assignors to Flexitallic Gasket Company, Inc., Camden, N.J.

Filed Mar. 23, 1972, Ser. No. 237,328

Int. Cl. B01d *46/00*

U.S. Cl. 55—97 **7 Claims**

6. In a high pressure steam conduit, an assembly comprising an orifice plate for producing a relatively large pressure drop in the conduit, first gasket means in engagement with the upstream side of the orifice plate for providing sealing between the orifice plate and the upstream side of the conduit, and second gasket means in engagement with the downstream side of the orifice plate for providing sealing between the orifice plate and the downstream side of the conduit, a screen in the conduit carried by the first gasket means on the upsteam side of the orifice providing a multiplicity of flow passages each having a cross section smaller than the orifice and a fluid



pervious support element positioned between the screen and the orifice plate and including means extending over portions of the screen and engaging the screen at a plurality of discrete locations for maintaining the screen in spaced relationship to the orifice plate.

3,877,896

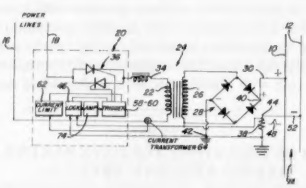
SOLID STATE VOLTAGE CONTROL SYSTEM FOR ELECTROSTATIC PRECIPITATORS

Nicholas G. Muskovac, Rockville, Md., assignor to Vectrol Inc., Rockville, Md.

Filed Aug. 14, 1973, Ser. No. 388,084

Int. Cl. B03c *3/68;* **G05f** *1/64*

U.S. Cl. 55—105 **7 Claims**



1. In a voltage control system for electrostatic precipitators comprising:

power input means for providing power to the system from power lines;

a transformer;

a primary of the transformer connected to the input means for developing an AC signal thereacross;

solid state gating means connected between the input means and the transformer primary for controlling power delivery to the primary;

first current sensing means coupled to the primary for developing a signal corresponding to current flow through the primary;

first switching means connected at the input thereof to the output of the sensing means for switching to a conductive state when a preselected threshold of the sensing means signal is exceeded indicating excessive current in the primary;

gate drive means connected at inputs thereof to the power input means and said first switching means, the output of the drive means connected to the gate means for triggering the gating means into conduction when said first switching means is in a non-conductive state;

the secondary of the transformer transforming the AC signal to a rectifier for rectification of the AC signal;

means connecting the rectifier to the precipitators for developing electrostatic charges thereon which attract particulate matter passing across the precipitators; and

resistor means connected to said rectifier for developing voltage pulses thereacross when arcing occurs between said precipitators;

logic means connected to receive said voltage pulses from said resistor means and for producing first and second control voltages in response thereto; and

soft start analog circuit means including second switching means responsive to said first and second control voltages for momentarily disabling said gate drive means and subsequently causing gradual increased power delivery from the power lines to the gating means.

3,877,897

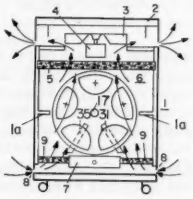
ELECTRIC PARTICLE PRECIPITATOR

Dov Z. Glucksman, Newton, Mass., assignor to Appliance Development Corporation, Boston, Mass.

Filed Dec. 5, 1972, Ser. No. 312,392

Int. Cl. B03c *3/10*

U.S. Cl. 55—111 **15 Claims**



1. An electric particle precipitator including

a. a stack formed by electrically charged spaced plates establishing electrostatic fields between juxtaposed surfaces thereof, some of the constituent plates of said stack consisting substantially of an electric insulating material having discrete areas provided with electrically conductive overlays thereon and being separated from each other by non-conductive surface elements;

b. a frame structure supporting said stack and motor means moving said stack relative to said frame structure;

c. fixed brush means engaging discrete portions of the constituent plates of said stack to remove particulate matter collected on the surfaces thereof; and

d. a switching device for removing any significant difference of potential between surfaces of the constituent plates of said stack being acted upon by said brush means.

3,877,898

ELECTRIC DUST COLLECTOR

Tsutomu Nomura, Kamakura, and Masakazu Sakai, Hiratsuka, both of Japan, assignors to Sumitomo Shipbuilding & Machinery Co., Ltd., Tokyo, Japan

Filed Sept. 5, 1973, Ser. No. 394,612

Int. Cl. B03c *3/16*

U.S. Cl. 55—122 **3 Claims**

1. An electrostatic precipitator overlying a vent hole within the roof of a factory building, said precipitator comprising:

an open ended outer shell extending upwardly from said roof and surrounding said vent hole for effecting flow of air from said building through said shell by the thermal buoyancy of said air,

a plurality of laterally spaced, vertical dust collecting electrodes within said shell,

a series of vertical, discharging electrodes corresponding to said collecting electrodes arranged at regular intervals, and interleaved between said collecting electrodes and being connected to an electric power supply,

said dust collecting electrodes being in planar sheet form and formed of light weight material,

and sets of vertically spaced louvers positioned beneath said electrodes with said louvers being inclined outwardly and downwardly toward respective side walls of said shell relative to the center line of the precipitator in order to prevent the washing water from flowing into the work shop through the vent hole.

3,877,899

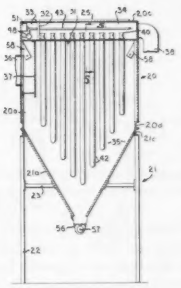
APPARATUS FOR SEPARATING PARTICULATE MATTER FROM A GAS STREAM

Richard P. Bundy, 5321 W. 69th St., Prairie Village, Kans. 66208; Larry D. McConnell, 502 Fourth St., Glasgow, Mo. 65254, and Stanley A. Reigel, 10001 Briar, Overland Park, Kans. 66207

Filed Sept. 28, 1972, Ser. No. 292,927

Int. Cl. B01d *46/04*

U.S. Cl. 55—272 **4 Claims**



1. Apparatus for separating particulate matter from a gas stream, said apparatus comprising:

a housing having an upper section of substantially rectangular shape and a lower, hopper-shaped section connected to said upper section;

a substantially horizontal, first partition disposed within the upper section of said housing, thereby defining a first chamber beneath said first partition and a region above said first partition;

a second partition disposed within said region above said first partition, thereby defining a second chamber and a third chamber and said third chamber being adjacent said first chamber;

first ventilation means communicating with said second chamber and the atmosphere and second ventilation means communicating with said second and third chambers to permit circulation of ambient air through said second chamber;

an inlet conduit for directing a gas stream containing particulate matter into said first chamber;

an outlet conduit communicating with said third chamber to exhaust gas therefrom;

a plurality of gas passages through said first partition establishing communication between said first and third chambers;

fan means for inducing gas flow through said inlet conduit into said first chamber, from said first chamber through said gas passages into said third chamber, and from said third chamber into said outlet conduit, and for inducing ambient air flow through said first ventilation means, from said first ventilation means through said second chamber, and from said second chamber through said second ventilation means to said third chamber;

porous filter means disposed within said passages and sealingly secured to said first partition for removing particulate matter from gas flowing from said first chamber into said third chamber;

compressed air and control means housed within said second chamber and including pipe members extending into said third chamber for directing an intermittent air blast toward said filter means to dislodge any particulate matter collected thereon.

3,877,900

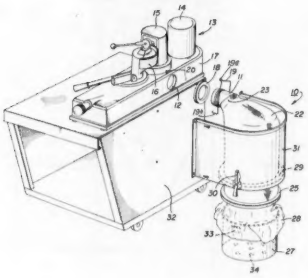
DUST COLLECTOR

Wallace F. Mitchell, Libertyville, Ill., assignor to Ammco Tools, Inc., North Chicago, Ill.

Filed Dec. 10, 1973, Ser. No. 423,413

Int. Cl. B01d *46/02*

U.S. Cl. 55—366 **1 Claim**



1. A dust collector for use with a grinding machine having an exhaust port through which dust laden air is emitted under pressure, the combination comprising,

an air pervious dust bag having an inlet sleeve near the top and an open bottom,

means for sealably connecting said sleeve to said exhaust port,

a resilient sealing ring fixedly connected to said bag and providing an external flange at the bottom end of said bag.

a rigid guard member adapted to be mounted in fixed relationship with said grinding machine and surrounding said dust bag,

a ring having a downwardly opening annular groove carried by said guard member near the bottom thereof,

said resilient sealing ring being held in said annular groove an open top perforate container,

an imperforate flexible bag disposed in said container with the rim portion of said bag overhanging the rim of said container, and

latch means securing said container to said guard with an annular portion of said bag compressed between the rim of said container and said resilient ring.

3,877,901

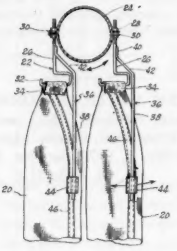
BAG FILTERS

Clyde A. Snyder, Mishawaka, Ind., assignor to Wheelabrator-Frye Inc., New York, N.Y.

Filed May 29, 1973, Ser. No. 364,375

Int. Cl. B01d *46/04*

U.S. Cl. 55—304 **6 Claims**



1. In a filter apparatus in which one or more elongate filter bags are suspended from their upper end from a shaking mechanism to extend vertically downwardly into a filter housing, the improvement comprising an operative connection between the shaking mechnism and one or more portions of the bag spaced below the upper end portion whereby a shaking force is imparted to the entire filter bag, in which the shaker mechanism comprises a shaker tube mounted for reciprocal rotational movement about a horizontal axis spaced above the uppper ends of the filter bags, and in which the operative connection between the shaking mechanism and the bags comprises tube hooks each of which has a hook member at the lower end portion from which a filter bag is releasably suspended, the upper ends of the tube hooks being fixed in pairs to opposite sides of the shaker tube for rocking movement of the tube hooks responsive to rotational movement of the shaker tube, elongate boot strap rods operatively connected to the shaker tube and extending downwardly alongsde the filter bags, and means connecting the filter bags to adjacent portions of the boot strap at one or more points spaced downwardly from the hook end of the tube hooks whereby rocking movement of greater dimension, magnitude and frequency is imparted to the filter bag.

3,877,902

FLOOR SURFACE TREATING APPARATUS

Bolik Anders Gottfrid Eriksson, Johanneshov, and Milos Vukotic, Tumba, both of Sweden, assignors to Aktiebolaget Electrolux, Stockholm, Sweden

Filed Nov. 29, 1973, Ser. No. 420,206

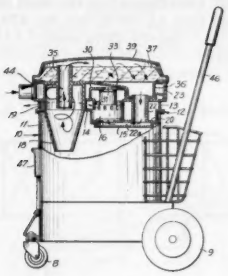
Claims priority, application Sweden, Apr. 27, 1973, 7305999

Int. Cl. B01d *50/00*

U.S. Cl. 55—337 **3 Claims**

1. A floor surface treating apparatus comprising a container having an upper part provided with an inlet opening for dust-laden air or liquid, a discharge opening for clean air, a lower part for collecting separated dust or separated liquid, a generally vertically disposed cyclone separation in said container operatively connected to said inlet opening, at least one motor-fan unit in said container for moving air through said container, a filter in said container, means mounting said filter above said separator and said motor-fan unit, said separator having an outlet, and a conduit system means including pipe means extending through said filter for transporting air from the separator through said outlet and said pipe means and through said filter to the inlet opening of said motor-fan unit and subsequently to said discharge opening for clean air, and conduit system means further constituting a passageway located between said filter and said inlet opening to the motor-

fan unit, said passageway having a laterally extending portion located below said motor-fan and in which liquid is collected

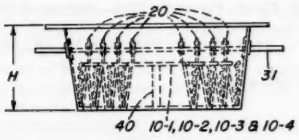


and substantially all the air passing through said filter moves therethrough and changes direction of movement to pass through said motor-fan unit.

3,877,903
FILTER ASSEMBLY

Donald A. Peterson, 3404 Brookdale Dr., Pittsburgh, Pa. 15241

Filed Sept. 22, 1972, Ser. No. 291,251
Int. Cl. B01d *27/06, 29/18*
U.S. Cl. 55—381 **6 Claims**



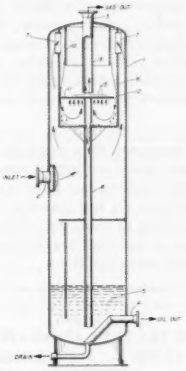
1. A filter assembly comprising the combination of:
a conically-shaped filter bag;
a plurality of rings having successively increasing diameters sewed into said filter bag for defining planes of support for said filter bag, the smallest diameter ring being sewed at the truncated conical apex of the filter bag and successively larger diameter rings being sewed into said filter bag at spaced parallel planes along the conical axis of the filter bag, the centers of said plurality of rings lying approximately along said conical axis;
a support tab sewed onto said filter bag at the diametrically-opposed sides of each ring of said plurality of rings, the tabs lying in a plane passing through said conical axis;
a pair of rod-supporting gaskets attached to said filter bag at opposite sides thereof and lying in said plane containing the support tabs and passing through the conical axis of the filter bag; and
rod means engaging each support tab and passing through said rod-supporting gaskets for supporting said filter bag.

3,877,904
GAS-LIQUID SEPARATOR

Neely E. Lowrie, Tulsa, Okla., assignor to Combustion Engineering, Inc., New York, N.Y.

Filed June 18, 1974, Ser. No. 480,328
Int. Cl. B01d *45/12*
U.S. Cl. 55—392 **3 Claims**

1. A separator for liquid and gas, including,
a cylindrical vessel mounted vertically,
an inlet in the vessel wall through which a mixture of liquid and gas is directed,
a cylindrical compartment mounted in the upper portion of the vessel and having a plurality of tangential inlet openings through its vertical wall and near the top of the compartment through which gas and entrained liquid is directed to flow tangential to the surface of the vertical internal wall of the compartment,
a cylindrical baffle mounted concentric to the vertical internal compartment wall and extending downward from the top of the compartment and spaced from the plurality of openings into the compartment so as to form a flow path for liquids of the mixture, the liquids flowing downward in the compartment and disengaging from the lower edge of the baffle,



an outlet for gas from the cylindrical compartment located coaxial with the compartment to remove the gas flowing vertically upward,
a circular plate mounted horizontally below the baffle and the gas outlet and spaced from the internal wall of the compartment and having holes through which gas of the mixture flows from beneath the plate to the outlet for gas, and
an outlet for liquid of the mixture from the compartment below the plate and in the lower portion of the compartment, whereby the liquid disengaging from the lower edge of the baffle is carried by a portion of the gas through the space between the edge of the circular plate and internal wall of the compartment to the lower portion of the compartment and the gas portion then disengages from the liquid as the gas flows up through the plate holes and through the gas outlet.

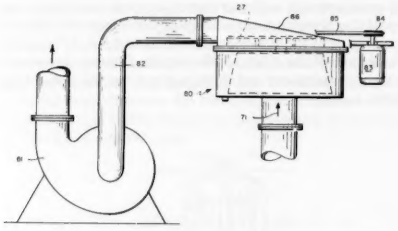
3,877,905
FILTRATION SYSTEM

Richard A. Novak, Boston, Mass., assignor to Advanced Product Engineering Corporation, Boston, Mass.

Filed Jan. 5, 1973, Ser. No. 321,312
Int. Cl. B01d *45/00;* **B04b** *5/12*
U.S. Cl. 55—404 **6 Claims**

1. A filtration system for removing particulate matter from a fluid medium, said system comprising a housing, a filter means positioned in the housing for rotation therewith, said housing having fluid inlet and fluid discharge means, a conical shell means positioned between said housing and said filter means defining a space for the reception of the fluid medium received at said inlet and containing particulate matter, said conical shell means supported by said filter means for rotation therewith, stationary annular nozzle means for imparting a

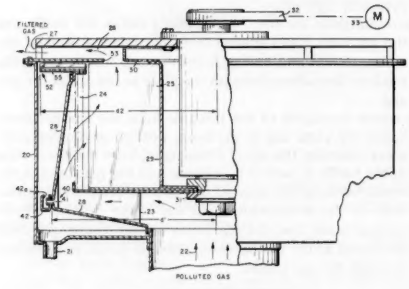
tangential velocity component to the fluid medium containing the particulate matter entering the inlet means, vanes supported by the conical shell and the filter means and rotatable therewith and against which the fluid impinges, and a blower upstream of the housing inlet and coupled thereto which supplies the fluid medium and the particulate matter to the



inlet matched in head and flow capacity so that the fluid impinging upon said vanes will impart rotary motion to said filter means, thereby causing said filter means to rotate at a speed which is sufficient for self-cleaning action.

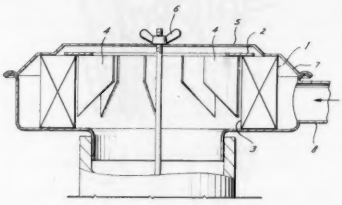
2. A system according to claim 1 in which the filter cage is driven with a motor, so that the filter means speed can be fixed independent of fluid flow conditions.

3,877,906
FILTRATION APPARATUS
Carl R. Peterson, 14 Elm St., Boxford, Mass. 01921
Filed Apr. 6, 1972, Ser. No. 241,747
Int. Cl. B01d *46/02*
U.S. Cl. 55—404 **1 Claim**



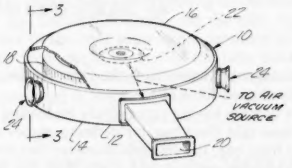
1. Apparatus for removing particulate matter from a fluid medium entering the apparatus at high pressure which comprises a housing, a filter means positioned in the housing for rotation therein, a shell means positioned between said housing and said filter means and defining a space for the reception of the fluid medium containing particulate matter, said shell means supporting vanes within said space for rotation therewith, and said shell means constructed to rotate with said filter means, means for permitting the passage of fluid from said housing after filtering, drive means comprising stationary annular nozzle means supported by the housing and positioned to cause rotation of said filter means, shell means and vanes upon the passage of fluid under high pressure therethrough as the fluid passes into the space for filtering, and means for collecting the particulate matter after filtering.

3,877,907
AIR SWIRLING UNIT FOR AIR FILTERS ON INTERNAL COMBUSTION ENGINES
Howard E. Elliff, 1301 Donna Kay Dr., Kerrville, Tex. 78028
Filed June 13, 1974, Ser. No. 479,154
Int. Cl. B01d *46/02*
U.S. Cl. 55—413 **4 Claims**



1. An air filter housing having an inlet and outlet employed on internal combustion engines, a cylindrical filter mounted in the housing intermediate the inlet and outlet to filter the air, a circular framework, and a plurality of inwardly and tangentially directed vanes depending from said framework, said framework being supported by said filter, and said vanes extending into the filter orifice of the filter mounted in said housing.

3,877,908
AIR FILTER ASSEMBLY WITH A CONTROLLED AUXILIARY AIR INLET
Harold E. Phelps, Plymouth, Mich., assignor to Harold Phelps, Inc., Plymouth, Mich.
Filed Mar. 19, 1974, Ser. No. 452,535
Int. Cl. B01d *27/08*
U.S. Cl. 55—419 **22 Claims**



1. In an air filter assembly for an air vacuum source such as an internal combustion engine, the filter assembly including filter means and an enclosure for the filter means, the enclosure having an air inlet and an air outlet extending through the filter means to the air vacuum source whereby the filter means filters the air passing therebetween, air valve apparatus supported by the enclosure for permitting ingress of additional air through the filter means to the air vacuum source under certain vacuum source conditions, the air valve apparatus including a housing supported by the enclosure and having an enlarged section provided with an open end communicating with the exterior of the enclosure, a valve section having an outlet opening therein communicating with the interior of the filter assembly and arranged relative to the filter means so that the air existing from the outlet opening passes through the filter means, a reduced section between the enlarged section and the valve section and the valve section, a cup shaped valve element having the open end thereof facing the enlarged section open end and being movable within the housing between open and closed positions relative to the outlet opening, and control means for the valve means operative in response to the certain vacuum source conditions to cause the valve

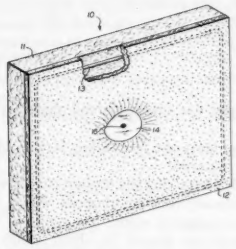
means to be moved from the closed position to the open position.

3,877,909

INTERNALLY SELF-SUPPORTING FILTER AND PROCESS FOR MAKING SAME

Elwood F. Hansen, Allendale, N.J., assignor to Drico Industrial Corporation, Wallington, N.J.

Filed Apr. 23, 1974, Ser. No. 463,643
Int. Cl. B01d *39/16*
U.S. Cl. 55—487 **14 Claims**



1. Internally supported composite frameless filter comprising:

a. at least two fluid permeable filter members having substantially the same peripheral shape;

b. a thin wire-like frame member positioned between said filter members and spaced inwardly from the periphery thereof;

c. the first of said filter members being the upstream filter layer and comprising a relatively thick, low density, medium to long filament puffed glass fiber layer;

d. the second of said filter members being the downsteam filtering layer and comprising a thin, relatively high density, non-woven, fibrous layer;

e. anti-bulge means including localized compression means centrally positioned on both sides of the composite filter compressively sandwiching said filter members therebetween, said compression means being rigidly attached to each other through said filter members; and

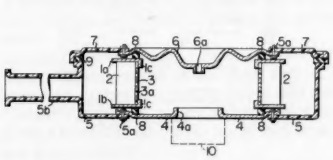
f. each of said filter members being adhesively secured to said frame member and being uncompacted throughout each of their entire thicknesses except in the area of said anti-bulge means.

3,877,910

AIR CLEANER

Masami Konishi, and Kenji Hikita, both of Toyohashi, Japan, assignors to Nipponoenso Co., Ltd., Kariya-shi and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota-shi, both of, Japan

Filed Sept. 15, 1972, Ser. No. 289,741
Claims priority, application Japan, Oct. 14, 1971, 46-94865
Int. Cl. B01d *46/40*
U.S. Cl. 55—502 **6 Claims**



1. An automotive air cleaner, comprising:

an inner casing including an upper end wall, a lower end wall, a tubular outer peripheral wall extending between said end walls, and sealing means between each end wall and the peripheral wall;

means defining an air outlet opening through the lower end wall;

means defining a plurality of openings through the outer peripheral wall for the passage of air into the inner casing;

a tubular air cleaning filter element coaxially juxtaposed with the outer peripheral wall and covering said plurality of openings, whereby air entering through said plurality of openings is filtered before it can leave the inner casing via said air outlet opening;

an annular outer casing including an upper end wall, a lower end wall and an outer peripheral wall, the outer casing peripherally surrounding the outer peripheral wall of the inner casing;

means securing the outer casing to the inner casing to unite the air cleaner;

means defining an air inlet opening into the outer casing, the air inlet opening means including a tubular neck extending outwardly from the outer peripheral wall of the outer casing, whereby air may enter the outer casing through the air inlet opening, then pass through the filter element, enter the inner casing, and pass out the air outlet opening;

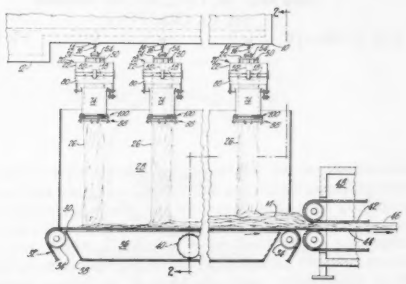
at least part of the air cleaner outer casing, including the neck of the air inlet opening, being constructed of more frangible, less crash-durable material than is the inner casing, so that when the air cleaner is juxtaposed on an automotive carburetor for supplying filtered air thereto, and a vehicular collision is experienced, there is an enhanced likelihood that, if the air cleaner becomes physically involved, the more frangible part will be sacrificially broken and the inner casing preserved intact, lowering the prospect for fuel escaping from the carburetor and burning.

3,877,911

METHOD AND APPARATUS FOR PRODUCING FIBERS

John A. Borst, San Jose, Calif., assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Sept. 13, 1972, Ser. No. 288,614
Int. Cl. C03b *37/04*; **C03c** *25/02*
U.S. Cl. 65—3 **2 Claims**

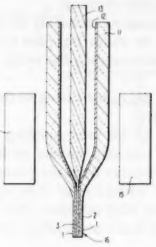


2. A method of forming fibers from molten mineral material including delivering molten material to a rotatable body, rotating the body to project streams of the material therefrom by centrifugal force, directing high velocity gases toward the streams of material to attenuate the streams into fibers and to form the fibers into a veil, directing the veil in a path away from said rotatable body, applying transverse forces to the veil to move the veil transversely of the path, subsequently supplying a coolant in a plurality of streams toward the center of the veil of fibers after being diverted from the path, and applying heat-curable binder to the veil after supplying the coolant to the veil.

3,877,912
METHOD OF PRODUCING AN OPTICAL TRANSMISSION LINE

Satoshi Shiraishi; Kunio Fujiwara, and Shiro Kurosaki, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Oct. 9, 1973, Ser. No. 404,567
Int. Cl. C03b 5/26
U.S. Cl. 65—3 16 Claims

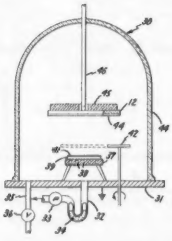


1. A method of producing an optical transmission line which comprises forming, on an inside wall of highly transparent cylinder medium, a highly transparent deposition layer having a refractive index higher than that of said cylinder medium thus to form a double-layered cylinder; coaxially inserting into said cylinders, a highly transparent round rod medium having the same refractive index as that of the said cylindrical media; then heating them to melt and draw so as to reduce the diameter thereby forming a fiber comprising a double-layered cylindrical medium and a round rod medium integrated coaxially without clearance between them.

3,877,913
METHOD OF MAKING A CATHODE FOR RF SPUTTERING AMORPHOUS SEMICONDUCTING THIN FILMS

Arthur C. M. Chen, and Jish-Min Wang, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 30, 1973, Ser. No. 346,468
Int. Cl. C03c 27/02
U.S. Cl. 65—18 5 Claims



1. The method of making an improved cathode for RF sputtering of chalcogenide glasses comprising the steps of:
grinding a bulk glass comprising germanium-tellurium-arsenic to a particle size of less than 80 mesh;
preparing a metallic substrate with a roughened contact surface for the glass;
heating and pressing together the ground bulk and said metallic substrate, said heating being at the softening temperature of said glass and said pressing being at a pressure of between 500 and 1500 pounds per square inch.

3,877,914
METHOD AND APPARATUS FOR MAKING GLASS SPHERES

Ib Von Irgens-Bergh, Copenhagen, Denmark, assignor to Potters Industries, Inc., Carlstadt, N.J.

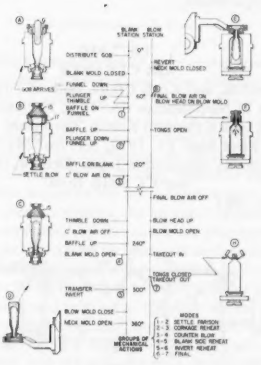
Filed June 18, 1973, Ser. No. 370,649
Int. Cl. C03b 19/10
U.S. Cl. 65—21 21 Claims

1. A method for making small diameter spheres which comprises:
providing at least one free falling stream of molten sphere-forming material;
successively contacting the molten stream with the blades of a continuously rotating chopper wheel, the wheel being rotated at a speed within the range of from about 150 revolutions per minute to about 4,500 revolutions per minute, to break up the stream into a multiplicity of discrete particles;
applying a moist fluid directly through the individual blades of the chopper wheel to provide a fluid cushion between the portion of each blade which contacts the molten stream and the molten stream;
the blades directing the multiplicity of discrete particles into a space for a period of time sufficient to enable surface tension to shape the particles into spherical form and to cause the setting thereof to form spheres; and
collecting the thus formed spheres.

3,877,915
CONTROL SYSTEM FOR GLASSWARE MOLDING MACHINE AND METHOD OF MOLDING GLASS

George Dudley Mylchreest, Simsbury, and Frederick Joseph Wythe, Hebron, both of Conn., assignors to Emhart Corporation, Bloomfield, Conn.

Filed June 29, 1973, Ser. No. 374,818
Int. Cl. C03b 9/26
U.S. Cl. 65—29 8 Claims



1. In a multi-section glassware forming machine, each of which sections includes at least the following mechanical means:

a. means for delivering gobs of molten glass to a blank station in the machine section at a rate, which rate can be varied,
b. a blank mold operable to and from an active position at the blank station,
c. a split neck mold operable between open and closed positions whereby said neck mold is adapted to cooperate with the blank mold to define a parison cavity,
d. a plunger operable to and from an active position at the blank station, and means for settling the gob into the neck mold,
e. secondary parison mold defining means operable to and from an active position at said blank station, and cooperating with said blank mold to define said parison cavity,
f. transfer means for moving said split neck molds and the parison formed in said cavity out of said blank station and into a blow station,
g. a split blow mold operable open and closed positions at said blow station,
h. means for final forming the parison at said blow station, and
i. take-out means for removing the final blown article from said blow station,

said machine being further characterized by the improvement comprising:

j. means for generating a series of pulses related in frequency to the rate at which gobs are delivered to the particular machine section,
k. computer means including a counter for counting said pulses,
l. said computer means including storage means for recording a preset pulse count at which each of said mechanical means is activated or deactivated,
m. said computer means including control means for comparing the instantaneous pulse count with said preset pulse counts and providing action signals in response to said comparison to actuate the operation of said mechanical means within each machine section cycle, and
n. said computer storage means further including means for arranging said preset pulse counts to define groups of actions of said mechanical means within each such machine section cycle, each of which groups includes an action of one of said mechanical means which defines a boundary between thermodynamic modes of the glassware forming cycle, said computer storage means also including means for shifting any boundary by a desired number of counts, with all preset counts of the actions of said mechanical means of that particular group being shifted a similar amount, whereby thermodynamic modes may be altered.

6. In a multi-section glassware forming machine, each of which sections includes at least the following mechanical means:

a. means for delivering gobs of molten glass to a blank station in the machine section at a rate, which rate can be varied,
b. a blank mold operable to and from an active position at the blank station,
c. a split neck mold operable between open and closed positions whereby said neck mold is adapted to cooperate with the blank mold to define a parison cavity,
d. a plunger operable to and from an active position at the blank station, and means for settling the gob into the neck mold,
e. secondary parison mold defining means operable to and from an active position at said blank station, and cooperating with said blank mold to define said parison cavity,
f. transfer means for moving said split neck molds and the parison formed in said cavity out of said blank station and into a blow station,
g. a split blow mold operable between open and closed positions at said blow station,
h. means for final forming the parison at said blow station, and
i. take-out means for removing the final blown article from mid blow station,

the method of controlling the glassware forming process comprising:

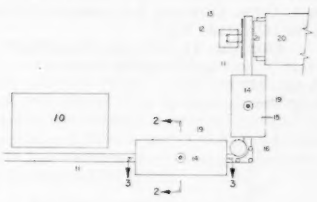
j. generating a series of pulses related in frequency to the rate at which govs are delivered to the particular machine section,
k. counting said pulses in a counter of a computer means,
l. storing a preset pulse count in said computer means at which each of said mechanical means is activated or deactivated,
m. comparing the instantaneous pulse count with said stored preset pulse counts in said computer means and providing action signals in response to said comparison to actuate the operation of said mechanical means within each machine section cycle,
n. arranging said preset pulse counts in said computer means to define groups of actions of said mechanical means within each such machine section cycle,
o. defining the action of one of said mechanical means in each group as a boundary between two adjacent thermodynamic modes of the glassware forming cycle, and
p. shifting the preset counts of actions of all said mechanical means within a group by a similar amount to the number of counts by which the action of said mechanical means defined to be a boundary in that particular group is shifted, whenever it is desired to alter a thermodynamic mode by shifting the boundary between two adjacent modes.

3,877,916

METHOD AND APPARATUS FOR PRE-HEATING GLASSWARE IN ITS PASSAGE FROM THE FORMING MACHINE TO THE ANNEALING LEHR

Edward W. Bowman, deceased, late of Tampa, Fla.; by Muriel B. Bowman, and by Michael Edward Bowman, executors, both of Uniontown, N.J., assignors to E. W. Bowman Incorporated, Uniontown, Pa.

Filed Oct. 2, 1973, Ser. No. 402,705
Int. Cl. C03b *25/04*
U.S. Cl. 65—119 **6 Claims**



1. Glass ware treating equipment for use in combination with a glass ware forming machine and a glass annealing lehr, said equipment comprising conveyor means for conveying said ware from said forming machine to the charging end of said lehr, heating chamber means enclosing a substantial length of said conveyor means, said heating chamber means including means for heating said ware substantially to its annealing temperature of approximately 1000° F whereby all strain imposed on the ware during formation thereof is released, and means for transferring said ware subsequent to pre-heating to said annealing lehr.

6. A method of pre-heating glass ware such as bottles and the like, comprising the steps of conveying said ware following formation thereof to the charging end of an annealing lehr, heating said ware along a substantial length of said conveyor by heating means enclosed around said conveyor so as to elevate the temperature of said ware to an annealing temperature of approximately 1000° F whereby all strain imposed on the ware during formation thereof is released, and transferring said ware when so pre-heated to the charging end of said

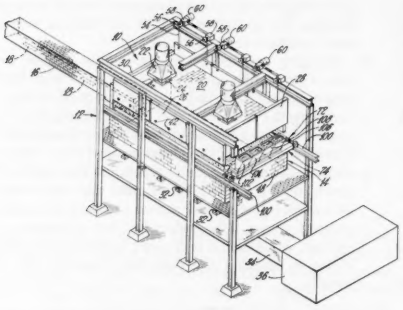
annealing lehr while substantially maintaining the annealing temperature thereof.

3,877,917

BATCH FEEDER FOR GLASS FURNACES AND METHOD OF USING SAME

Charles M. Hohman, Newark, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Oct. 24, 1973, Ser. No. 409,196
Int. Cl. C03b *3/00*
U.S. Cl. 65—135 **20 Claims**



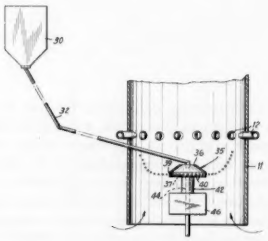
12. A method of feeding particulate glass batch to the surface of a layer of batch on a pool of molten glass in a glass melting tank which comprises positioning a plurality of individual glass batch supply means above the layer across the pool, moving said supply means back and forth over the layer in the tank, and individually depositing batch from each of said supply means onto areas of the layer as the supply means move back and forth thereover.

3,877,918

APPARATUS FOR PRODUCING SPHERICAL PARTICLES

Thomas A. Cerbo, Carlstadt, N.J., assignor to Potters Industries, Inc., Carlstadt, N.J.

Filed Mar. 11, 1974, Ser. No. 450,089
Int. Cl. C03b *19/10*
U.S. Cl. 65—142 **18 Claims**



1. Apparatus for producing spherical particles comprising, in combination:

heat source means;

means defining a chamber disposed about the heat source means;

supply means containing crushed particles in spaced relationship with the chamber;

means for conveying crushed particles from the supply means to the interior of the chamber;

a rotary receptacle disposed within the chamber for receiving crushed particles from the conveying means, the receptacle including an inner particle-receiving cavity and a multiplicity of orifices extending radially from the cavity;

means for rotating the receptacle at a speed sufficient to centrifugally project the crushed particles through the orifices in the receptacle and into the interior of the chamber, to form a cloud of evenly dispersed particles within said chamber, the heat within said chamber shaping the particles by surface tension into spheres; and

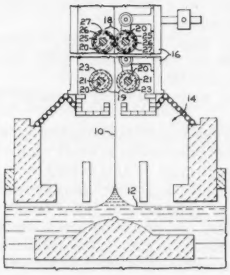
collection means connected to the chamber for receiving the thus produced spheres.

3,877,919

TRACTION ROLLS FOR USE IN GLASS MAKING

Norman Shorr, Pittsburgh, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sept. 26, 1973, Ser. No. 401,101
Int. Cl. C03b *13/16, 15/04*
U.S. Cl. 65—194 **14 Claims**



1. A traction roll for engaging glass comprising:

a mandrel,

a roll body comprising an asbestos material mounted on said mandrel to provide resiliency to said roll body; and

a thin layer of a dense, durable material having a density greater than the density of said asbestos material surrounding said roll body, said durable material being selected from the group consisting of aluminosilicate, an oxide of chromium, manganese, iron, cobalt, nickel, copper and mixtures thereof, a silicone rubber and an elastic heat resistant, thermosetting organic polymer having ignition and degradation points above about 500°F., and being selected from the group consisting of polyimides, polyoxazolidones, polysulfones and polyphenyl oxides.

7. A traction roll for engaging glass, comprising:

a mandrel; and

a roll body mounted on said mandrel, said roll body made of asbestos impregnated with an alkaline earth metal sulfate.

9. In a sheet drawing machine comprising a drawing kiln and thereabove an enclosed cooling chamber comprising a kiln portion, a lehr portion and a conveying and cooling portion, each having traction rolls therein, the improvement comprising, in said kiln portion and in said lehr portion, traction rolls, each comprising an asbestos roll body overlaid with aluminosilicate, and, in said conveying and cooling portion, traction rolls, each comprising a roll body overlaid with an elastic material further overlaid with a heat resistant, thermosetting, organic polymer having an ignition and degradation temperature of above about 500°F. selected from the group consisting of polyimides, polyoxazolidones, polysulfones and polyphenyl oxides.

3,877,920

METHOD OF RECLAIMING WASTES AND PRODUCTS THEREFROM

George Carlberg, Rt. 1, Box 24, Manns Choice, Pa. 15550

Filed Jan. 31, 1973, Ser. No. 328,359
Int. Cl. C05f *3/00*
U.S. Cl. 71—21 10 Claims

1. A deodorized fertilizer composition consisting essentially of a hemogeneous mixture of animal manure organic waste and a fly ash binder present in an amount effective in deodorizing said organic waste, said fly ash having the following composition: 29–57% silica 5–32% of alumina, 2–41% of ferric oxide, up to 14% of calcium oxide, up to 3% magnesium oxide, up to 8% of sulfur trioxide, up to 2% of sodium oxide, and up to 3% of trace metal oxides, the weight ratio between said organic waste and said fly ash binder ranging from about 20:1 to about 1:9.

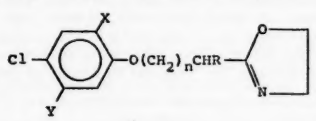
3,877,921

HERBICIDAL PHENOXYALKYLOXAZOLINES

Richard J. Timmons, and William E. Gallant, both of Marysville, Ohio, assignors to The O. M. Scott and Sons Company, Marysville, Ohio

Division of Ser. No. 157,711, June 28, 1971, Pat. No. 3,778,445. This application Sept. 18, 1973, Ser. No. 398,535
Int. Cl. A01n *9/22*
U.S. Cl. 71—76 12 Claims

5. The post-emergent method of inhibiting the growth of a plant species comprising the step of applying to an area in which the species is present in an amount sufficient to cause growth inhibition a formulation in which the growth inhibiting ingredient is at least one compound of the formula



where X is hydrogen, chlorine, or methyl; Y is hydrogen or chlorine; *n* is 0 or 2; and R is hydrogen or methyl when *n* is 0 and hydrogen when *n* is 2.

3,877,922

ALGICIDAL DIHALOMETHYLGLUTARONITRILES

Nathaniel Grier, Englewood, and Seymour J. Lederer, Fair Lawn, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 102,197, Dec. 28, 1970. This application June 19, 1974, Ser. No. 480,664
Int. Cl. A01n *9/20*
U.S. Cl. 71—67 1 Claim

1. The method of controlling the growth of algae which comprises contacting the area upon which the growth of algae is to be controlled with an algicidally effective amount of 2-bromo-2-bromomethylglutaronitrile.

3,877,923

PROCESS FOR REGULATING OR INFLUENCING THE GROWTH AND METABOLISM OF PLANTS

Hubert Mayr, Leonding near Linz/Donau; Elfriede Presoly; Ferdinand Weinrotter, both of Linz/Donau; Walter Müller, Leonding near Linz/Donau; Gerhard Stern, Linz/Donau, all of Austria, and Walter Mizzi Frohner, deceased, late of Pasching near Linz/Donau, Austria (by Maria Frohner, administrator), assignors to Chemie Linz Aktiengesellschaft, Linz/Donau, Austria

Filed Mar. 8, 1972, Ser. No. 232,973
Claims priority, application Austria, Mar. 8, 1971, 2000/71
Int. Cl. A01n *91/24*
U.S. Cl. 71—88 7 Claims

1. a process for increasing the resistance of plants to drought, which comprises treating the plants themselves, with an active compound selected from the group consisting of aliphatic epoxymonocarboxylic acids containing one to three epoxy groups and 6 to 22 carbon atoms and the salts, lower alkyl esters, lower polyhydroxyalkyl esters, amides, monoalkylamides and dialkylamides thereof.

3,877,924

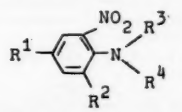
HERBICIDE

Adolf Fischer, Mutterstadt, Germany, assignor to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen/-Rhein, Germany

Filed Oct. 5, 1970, Ser. No. 78,244
Claims priority, application Germany, Oct. 8, 1969, 1950601
Int. Cl. A01n *9/22*
U.S. Cl. 71—92 10 Claims

1. A herbicide composition containing a herbicidally effective amount of a mixture of

a. a compound having the formula



wherein R^1 is trifluoromethyl and R^2 is nitro, R^3 is propyl or β-chloroethyl and R^4 is propyl or allyl, and

b. a compound selected from the group consisting of 2-(m-isopropylcarbamoyloxyphenyl)-4-methyl-1,2,4-oxadiazolidine-3,5-dione and 2-(3,4-dichlorophenyl)-4-methyl-1,2,4-oxadiazolidine-3,5-dione in a weight ratio of *a:b* in the range of 5:1 to 1:3.

3,877,925

PRE-EMERGENT CHEMICAL CONTROL OF WEEDS WITH N-BENZYL-N-ISOPROPYLTHIOBENZAMIDES

Roger P. Cahoy, Overland Park, Kans., assignor to Gulf Research & Development Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 88,166, Nov. 9, 1970, Pat. No. 3,707,366, which is a continuation-in-part of Ser. No. 9,419, Feb. 6, 1970, abandoned. This application Mar. 20, 1972, Ser. No. 236,188The portion of the term of this patent subsequent to Dec. 26, 1991, has been disclaimed.
Int. Cl. A01n *9/20*
U.S. Cl. 71—98 2 Claims

1. The method of combating unwanted vegetation by applying pre-emergently to the locus of the seeds of unwanted vegetation a herbicidally effective quantity of a compound selected from the group consisting of

N-benzyl-N-isopropyl-3,5-dichlorothiobenzamide,
N-benzyl-N-isopropyl-3,5-dimethylthiobenzamide,
N-benzyl-N-isopropyl-3-chlorothiobenzamide, and
N-benzyl-N-isopropyl-3-chloro-5-methylthiobenzamide.

3,877,926
HERBICIDAL COMPOUNDS, COMPOSITIONS AND METHODS

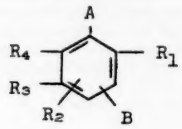
Elmore Louis Martin, 53 Paschall Rd., Shellburne, Wilmington, Del. 19803

Continuation-in-part of Ser. Nos. 153,429, June 15, 1971, abandoned, and Ser. No. 153,427, June 15, 1971, abandoned. This application Apr. 6, 1972, Ser. No. 241,800

Int. Cl. A01n *9/20*

U.S. Cl. 71—105 **5 Claims**

1. A method of controlling undesirable vegetation, said method comprising applying to the locus of said undesirable vegetation an herbicidally effective amount of at least one compound represented by the formula:



wherein

A is $-CR_5R_6CN$;

B is $-CR_7R_8CN$;

each of R_5, R_6, R_7, and R_8 independently being hydrogen or methyl;

R_1 is alkyl of 3 through 5 carbon atoms;

R_2 is hydrogen or chlorine;

R_3 is alkyl of 3 through 5 carbon atoms or nitro; and

R_4 is hydrogen or chlorine; provided that each alkyl group has at most three carbon atoms in a straight chain from the point of attachment to the aromatic ring.

3,877,927
HERBICIDAL COMPOSITIONS AND METHODS

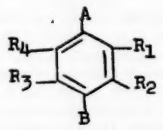
Elmore Louis Martin, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 201,995, Nov. 24, 1971, abandoned. This application Apr. 6, 1972, Ser. No. 241,849

Int. Cl. A01n *9/20*

U.S. Cl. 71—105 **6 Claims**

1. An herbicidal composition consisting essentially of a carrier and an effective amount of at least one compound having the formula



wherein

A and B are different, one being a Z group and the other being a CR_5R_6Z radical; wherein R_5 and R_6 are each independently hydrogen or methyl; and Z is the cyano group;

R_1 and R_3 are each independently a C_3-C_5 alkyl group; and R_2 and R_4 are hydrogen; provided that each alkyl group has at most three carbon atoms in a straight chain from the point of attachment to the aromatic ring.

3,877,928
LIQUID SOLUBLE PACKET

Walter A. Houston, P.O. Box 278, Mt. Prospect, Ill. 60068, and Lynn K. Brunn, 701 Derchalt, Madison, Wis. 53711

Continuation-in-part of Ser. No. 659,029, Aug. 8, 1967, abandoned. This application Oct. 12, 1970, Ser. No. 80,246

Int. Cl. A01n *9/20*

U.S. Cl. 71—111 **3 Claims**

1. A method of forming a single portion pesticide packet having a sealed pouch defining a cavity therein, comprising the steps of constructing said pouch of a relatively thin water soluble film, depositing into the cavity defined by said pouch a predetermined quantity of a water-insoluble pesticide composition consisting essentially of a pesticide powder including insoluble particles, a powdered dispersing agent in an amount of between 5 per cent to 15 per cent of the weight of said insoluble pesticide particles, and a powdered wetting agent in an amount of between 3.5 per cent to 15 per cent of the weight of said insoluble pesticide so that upon immersion of said pouch into a water, the contents therein will be released readily forming and maintaining a lengthy suspension within the liquid without the necessity of slurry preparation or continued agitation.

3,877,929
PROCESS FOR REDUCING IRON CONTENT OF TITANIFEROUS MATERIAL

Jack Whitehead, S. Cote, Church Ln., Middlesbrough, and Frederick George Salt, Thorpe Rd., Stockton-on-Tees, both of England

Continuation of Ser. No. 60,124, July 31, 1970. This application Aug. 29, 1972, Ser. No. 279,110

Claims priority, application United Kingdom, July 31, 1969, 38475/69

Int. Cl. C22b *1/10, 53/00*

U.S. Cl. 75—1 **11 Claims**

1. A process for reducing the iron content containing titaniferous material comprising oxidising said titaniferous material until substantially all the iron content is in the ferric state, and contacting said oxidised material in a fluidised bed at a temperature within the range 650°C. to 950°C. with a mixture of hydrogen and added steam until not more than 2 percent of the iron content of said material is in a form other than the ferrous state, the proportion of steam in the mixture being in the range of about 2 to 5 percent by volume of hydrogen.

3,877,930
ORGANIC INTERDISPERSION COLD BONDING CONTROL AGENTS FOR USE IN MECHANICAL ALLOYING

Timothy Earl Volin, Tuxedo, N.Y., assignor to The International Nickel Company, Inc., New York, N.Y.

Filed Jan. 29, 1973, Ser. No. 327,321

Int. Cl. B22f *9/00*

U.S. Cl. 75—0.5 R **2 Claims**

1. In the process of producing mechanically alloyed superalloy composite product powder particles consisting of up to 65 percent chromium, up to 10 percent alluminum, up to 8 percent titanium, up to 30 percent molybdenum, up to 25 percent tungsten, up to 10 percent columbium, up to 10 percent tantalum, up to 7 percent zirconium, up to 0.5 percent boron, up to 5 percent hafnium, up to 2 percent vanadium, up to 6 percent copper, up to 5 percent manganese, up to 70 percent iron, and the balance essentially nickel and/or cobalt, the improvement which comprises conducting the mechanical alloying operation in the presence of an interdispersion cold bonding agent (ICBCA) selected from the group consisting of methane, ethane, propane and hexane, the ICBCA being in contact with the powder particles to be mechanically alloyed and being present in an amount effective to provide the necessary control balance during the course of the operation with the upper limit being not greater than 3 percent by weight of the powder charge, the control balance being such that an

intimate interdispersion of constituent powders is achieved without incurring serious impairment of the mechanical properties of the composition to be produced and without either the formation of an appreciable amount of detrimentally large composite particles or the deleterious adherence of powders to the milling elements or mill interior surfaces.

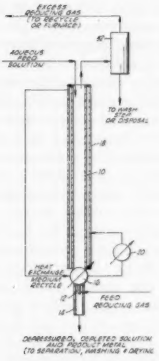
3,877,931
CONTINUOUS PREPARATION OF PURE METALS BY GASEOUS REDUCTION

Daniel R. Neskora, 500 Chautaugua; Cedomir M. Sliepcevich, 2500 Butler Dr., and Robert L. Brown, 1301 Larman Cir., all of Norman, Okla. 73069

Continuation-in-part of Ser. No. 381,051, July 20, 1973, Pat. No. 3,833,851, which is a continuation-in-part of Ser. No. 332,679, Feb. 15, 1973, abandoned. This application May 13, 1974, Ser. No. 469,098

Int. Cl. C22b *23/04*

U.S. Cl. 75—0.5 AA **12 Claims**



1. In a process for continuously recovering metallic copper, nickel, cobalt, silver or gold from an aqueous solution containing a soluble salt of one or more of these metals, and having a selected pH and a selected free ammonia-to-metal ratio ranging from 0:1 up to about 6:1, depending upon the metal to be recovered, by continuously mixing the solution with a reducing gas in a tubular reactor, the improvement which comprises:

continuously charging the solution and any needed particulate catalyst to a tubular reactor while simultaneously introducing a reducing gas to said reactor at a point spaced from the point at which the solution is charged to the reactor in a flow direction countercurrent to the flow direction of the solution;

heating the mixture of the solution and the gas to a temperature of at least 200°F prior to passing out of the reactor, said reactor being maintained, during the charging of the solution and introduction of the gas, under substantially steady state conditions in which

a. the partial pressure of the reducing gas is at least 50 psig, and the total pressure on the solution is sufficient to prevent boiling of the solution;

b. the quantity of reducing gas passed through the reactor countercurrently with the aqueous solution is in excess of that required for stoichiometric reduction of the metal values to be recovered and in sufficient quantity and flow rate to agitate the mixture to a state of modified plug flow in which localized, limited backmixing occurs, and in which

c. the mixture is of heterogeneous character over the length of the reactor; then

separating the metal powder to be recovered from the effluent mixture of spent solution and solids discharged from the reactor.

3,877,932
PRESSURE CEMENTATION PROCESS FOR RECOVERY OF COPPER FROM SOLUTION

Carl H. Elges, III, Reno, Nev., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Feb. 21, 1974, Ser. No. 444,575

Int. Cl. C22b *15/12*

U.S. Cl. 75—109 **6 Claims**

1. A process for precipitating copper values from an acidic leach solution containing cupric, ferric, ferrous and sulfate ions which comprises:

contacting the solution with metallic iron in a closed vessel under a hydrogen pressure of at least 50 psi for a time sufficient to precipitate at least a major portion of the copper from the solution, and

separating the precipitated copper from the copper-depleted solution.

3,877,933
METALLURGICAL ADDITION PRODUCT

John K. Pargeter, New York, N.Y.; Loris M. Diran, Hackensack, and Francis J. Hennion, Prospect Park, both of N.J., assignors to The International Nickel Company, Inc., New York, N.Y.

Filed Sept. 21, 1973, Ser. No. 399,467

Int. Cl. C22c *1/00;* **C22b** *9/10*

U.S. Cl. 75—129 **7 Claims**

1. A metallurgical addition package comprising a ventable steel can permeable to gas at about 600°C. to about 1000°C., and non-contaminating with respect to a chromium-containing alloy melt packed with particulate nickel oxide sinter along with a quantity of finely divided petroleum coke in an amount stoichiometrically equivalent for reducing purposes to said nickel oxide, the petroleum coke being intimately mixed with and adherent to said particulate nickel oxide sinter.

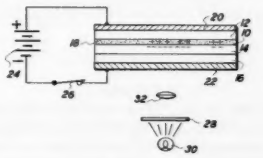
3,877,934
INDUCTION IMAGING WITH IN-PLACE DEVELOPMENT

Fred W. Schmidlin, Pittsford, N.Y., assignor to Xerox Corporation, Rochester, N.Y.

Division of Ser. No. 212,220, Dec. 27, 1971, abandoned. This application Aug. 29, 1973, Ser. No. 392,600

Int. Cl. G03g *13/14*

U.S. Cl. 96—1.4 **10 Claims**



1. A method of image reproduction comprising the steps of: depositing a developer material comprising electrically charged toner particles dispersed in an insulating liquid between an electric charge transfer blocking means, which is positioned adjacent a surface of a photoconductor body, and an image transfer medium;

establishing an electric field of predetermined polarity between said photoconductor and said transfer medium for exerting an electrostatic force on said charged particles

and causing said particles to uniformly migrate toward said photoconductor,

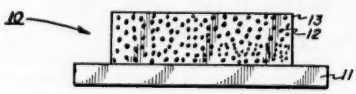
subjecting said photoconductor to activating electromagnetic radiation in image configuration to increase the electrostatic force exerted on said particles adjacent light struck areas of said photoconductor, and

establishing between said photoconductor and transfer medium an electric field of opposite polarity and having a magnitude for causing the transfer of particles corresponding to non-light struck areas of said photoconductor to transfer in image configuration to said transfer medium to form an image thereon, said magnitude being insufficient to remove particles corresponding to light struck areas of said photoconductor thereby providing an image on said charge blocking means formed by said transfer of particles in non-light struck areas.

3,877,935
NOVEL XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING POLYNUCLEAR QUINONE PIGMENTS

Paul J. Regensburger, Webster, and James J. Jakubowski, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 94,066, Dec. 1, 1970, abandoned.
This application Sept. 27, 1972, Ser. No. 292,702
Int. Cl. G03g *5/06*
U.S. Cl. 96—1.5 **22 Claims**



1. an electrophotographic plate having a photoreceptor binder layer consisting essentially of photoconductive particles dispersed in an active transport binder in an unoriented fashion in an amount of from about 0.1 to 5 percent by volume of said binder, said binder and particles being compatible so as to support efficient photogenerated charge injection from said photoconductive particles, said photoconductive particles comprising a pigment selected from anthanthrone, dibenzpyrenequinone, brominated dibenzpyrenequinone, brominated pyranthrone, and flavanthrone, and said active transport binder consisting essentially of a material selected from the group consisting of electron transport and hole transport materials, said binder material being capable of supporting the injection and transport of photogenerated charges from said photoconductive particles through said binder material and being substantially transparent in the wavelength region of from about **4000** to **6000** Angstrom Units, and wherein said active transport binder has a thickness of from about 5 to 100 microns.

3,877,936
PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE

William W. Limburg, Penfield, and Donald A. Seanor, Pittsford, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Mar. 19, 1973, Ser. No. 342,646
Int. Cl. G03g *5/06*
U.S. Cl. 96—1.5 **15 Claims**

1. An imaging member useful in electrophotography comprising a conductive substrate and overlying at least one surface of said substrate a substantially continuous polymeric photoconductive film comprising a copolymer having structural units from (i) N-vinylcarbazole and (ii) N-vinylphthalimide.

3,877,937
POLYRHODANINE SENSITIZERS FOR ORGANIC PHOTOCONDUCTORS

Juergen H. H. Keller, Chelmsford, and Robert H. Sprague, Carlisle, both of Mass., assignors to Itek Corporation, Lexington, Mass.

Filed June 4, 1973, Ser. No. 366,906
Int. Cl. G03g *5/06*
U.S. Cl. 96—1.6 **8 Claims**

8. A composition of claim **7** wherein R equals a C_1–C_4 alkyl.

3,877,938
ETCH-BLEACHING METHOD

Fumiaki Shinozaki; Masayoshi Tsuboi, and Tomoaki Ikeda, all of Saitama, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 26, 1973, Ser. No. 326,721
Claims priority, application Japan, Jan. 28, 1972, 47-10671
Int. Cl. G03c *5/54, 7/02, 5/32*
U.S. Cl. 96—29 L **9 Claims**

1. An etch-bleach method for forming a printing plate which comprises forming a silver image in a hydrophilic cellulose layer by image-wise exposing a light-sensitive silver halide emulsion layer and developing said light-sensitive silver halide emulsion layer using a diffusion transfer developer with said exposed light-sensitive silver halide emulsion layer being in contact with a hydrolyzed hydrophilic cellulose layer containing diffusion transfer nuclei, removing the emulsion layer and obtaining said silver image and then processing the silver image with an etch-bleaching solution comprising an aqueous oxidizing agent solution wherein the improvement comprises processing the etch-bleached hydrophilic layer with an aqueous solution of a water-soluble organic compound having a physical adsorptive property to the hydrophilic cellulose and having at least one anionic substituent, said water-soluble organic compound being a direct cotton dye, basic dye, naphthol dye or acidic dye having one or more of the following substituents; a sulfo group, sulfino group, $-COO^-$ group, CS_2^- group, carboxyl group, or a salt thereof, and then removing the hydrophilic portion remaining at the image areas without damaging the hydrophilic portion at the non-image areas.

3,877,939
PHOTOPOLYMER PRINTING PLATES AND COATED RELIEF PRINTING PLATES

Sakuo Okai, Kyoto, Japan, assignor to Nippon Paint Co., Ltd., Osaka, Japan

Filed June 25, 1973, Ser. No. 373,174
Int. Cl. G03c *5/00;* **G03f** *7/00*
U.S. Cl. 96—36.3 **12 Claims**

1. In a photopolymer printing plate developable with water and including a metallic support material and a layer of a water-soluble photosensitive resin composition disposed thereon, said resin composition including:

a. about 0.001 to 0.15 parts by weight of a polymerization initiator activatable by actinic light;

b. about 0.1 to 3.0 parts by weight of at least one unsaturated ethylenic monomer capable of forming a polymer by photo-initiated polymerization in the presence of a polymerization initiator activatable by actinic; and

c. about 0.1 to 1.0 parts by weight of a partially saponified, water-soluble, polyvinyl acetate polymer compatible with said monomers, containing both acetyl and hydroxy groups, and having a polymerization degree of about 300 to 2000 and a saponification degree of about 65 to 99 mole percent, the improvement comprising:

the surface of said metallic support material being treated with a treating composition containing water, a chromic compound selected from the group consisting of chromic acid or sodium bichromate, and at least one additional component selected from the group consisting of potassium ferricyanide, potassium fluosilicate, sodium ferrocyanide, sodium fluoborate, and potassium fluozirconate; and said treated metallic support

material having applied thereto prior to the deposition of said resin composition thereon a thin layer of an adhesion-promoting primer composition selected from the group consisting of an aqueous solution of partially saponified polyvinyl acetate, a mixture of β-hydroxyethyl methacrylate, water and partially saponified polyvinyl acetate, and a mixture of partially saponified polyvinyl acetate and an emulsion of ethylene-acrylic acid copolymer resin, and layer of adhesion-promoting primer layer having a thickness in the range of about 0.1 to 0.4 mil.

3,877,940

PHOTOTHERMOGRAPHIC ELEMENT, COMPOSITION AND PROCESS

Ronald H. Ericson, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 19, 1974, Ser. No. 443,890

Int. Cl. G03c *5/24, 1/02, 1/34*

U.S. Cl. 96—48 HD **25 Claims**

22. A process of developing and stabilizing an image in a photothermographic element comprising (A) photosensitive silver halide in association with (B) an oxidation-reduction image-forming combination comprising (i) a silver salt of a long-chain fatty acid with (ii) an organic reducing agent, (C) a polymeric binder for said layer, and (D) a stabilizer precursor comprising a combination of (a) a blocked thione stabilizer precursor with (b) a halogen containing stabilizer precursor, comprising heating said element to about 80° to about 250°C.

3,877,941

NITRO-SUBSTITUTED ARYL AMIDE AMINE PROGENITOR AND THE USE THEREOF IN PHOTOGRAPHIC PROCESSES

Joachim Werner Lohmann, Wilrijk, Belgium, assignor to Agfa-Gevaert, Mortsel, Belgium

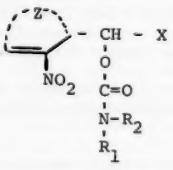
Filed June 29, 1973, Ser. No. 374,974

Claims priority, application United Kingdom, June 30, 1972, 30885/72

Int. Cl. G03c *5/24, 1/00, 1/52*

U.S. Cl. 96—48 R **10 Claims**

1. In a photographic process in which an amine is imagewise released from an amine source carried on a support and including the step of imagewise exposing said support to activating radiation, the improvement wherein said amine source is a photosensitive amine progenitor corresponding to the following general formula:



in which:

Z represents the necessary atoms to close a nitro-substituted aryl group,

X is a nitro-substituted aryl group,

R_1 is hydrogen, an aliphatic group, a cycloaliphatic group, or an aromatic group, and

R_2 is hydrogen.

3,877,942

METHOD OF FORMING PHOTOGRAPHIC IMAGES

Shigeru Nagatomo; Kiyotaka Hori; Takushi Miyazako, and Shinji Sakaguchi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

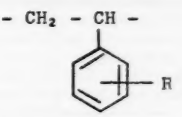
Filed Apr. 23, 1974, Ser. No. 463,321

Claims priority, application Japan, Apr. 27, 1973, 48-47735

Int. Cl. G03c *5/26*

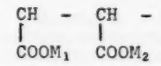
U.S. Cl. 96—50 R **10 Claims**

1. A method of forming photographic images which comprises developing at above 30°C a photographic one material comprising a support having thereon at least on photosensitive emulsion layer and a surface layer comprising a hydrophilic binder and containing a copolymer including repeating units represented by the formula (I)



(I)

and repeating units represented by the formula (II)



(II)

wherein R represents a hydrogen atom or a methyl group, and M_1 and M_2 each represents a member selected from the group consisting of a hydrogen atom, a lithium atom, a sodium atom, a potassium atom and an ammonium group, whereby occurrence of reticulation decreases and anti-adhesive properties are improved.

3,877,943

HEAT DEVELOPABLE PHOTOGRAPHIC MATERIAL

Takao Masuda, Saitama, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 5, 1974, Ser. No. 439,771

Claims priority, application Japan, Feb. 6, 1973, 48-14916

Int. Cl. G03c *1/28, 1/72*

U.S. Cl. 96—67 **17 Claims**

1. A heat developable photographic material comprising a support having at least one photosensitive layer containing the following components:

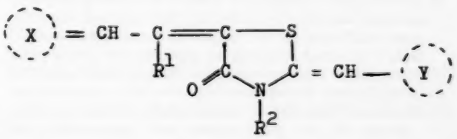
a. an organic silver salt,

b. a catalytic amount of a photosensitive silver halide or a compound which reacts with said organic silver salt (a) to produce a photosensitive silver halide,

c. a reducing agent,

d. a binder, and

e. a compound of the following formula:



wherein R^1 and R^2 each represents a hydrogen atom, an alkyl group or a phenyl group, and X and Y each represents a monovalent or divalent atomic group necessary for forming a five-membered or six-membered heterocyclic group containing a nitrogen atom(s), said heterocyclic group optionally containing substituent(s) and/or fused ring(s).

3,877,944

PHOTOGRAPHIC SILVER SALT EMULSIONS COMPRISING POLYMERS WITH DISULFONIMIDE GROUPS

Wilhelm Saleck, Schildgen; Gerhard Balle, Cologne, and Wolfgang Himmelmann, Opladen, all of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Bayerwerk, Germany

Division of Ser. No. 308,565, Nov. 21, 1972, Pat. No. 3,827,890. This application Mar. 15, 1974, Ser. No. 451,543

Claims priority, application Germany, Nov. 24, 1971, 2158196

Int. Cl. G03c *1/04*

U.S. Cl. 96—67 5 Claims

1. A photographic material containing at least one supported silver salt gelatin emulsion layer, which contains a polymeric disulfonimide, the disulfonimide groups being attached to the polymer chain either directly or via bridge members.

3,877,945

LIGHT-SENSITIVE PHOTOGRAPHIC MATERIAL WITH CATIONIC POLYURETHANE MORDANT

Lothar Rosenhahn, and Peter Bergthaller, both of Cologne, Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 21, 1974, Ser. No. 453,304

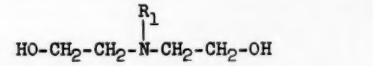
Claims priority, application Germany, Mar. 27, 1973, 2315304

Int. Cl. G03c *1/84*

U.S. Cl. 96—84 A 7 Claims

1. A light-sensitive photographic material containing at least one silver halide emulsion layer and having at least one colloidal layer, which contains in said emulsion or in said layer at least one anionic organic compound and a basic mordant for said anionic organic compound comprising a polymer of a water soluble or water dispersable cationic polyurethane wherein the improvement comprises the cationic polyurethane is a polymer having at least two recurring units prepared from

a. an alkanediol component of which at least 80 mols % by weight is one or more amino containing diols of the formula



and up to 20 mols % by weight is one or more diols of the formula

$HO-R_3-OH$

alternating with

b. a diisocyanate component selected from the group consisting of aliphatic, cycloaliphatic and aromatic diisocyanates, said diisocyanate component containing at least 40 mols % by weight aliphatic or aliphatic and cycloaliphtic diisocyanate and not more than 20 mols % by weight of cycloaliphatic diisocyanate;

wherein at least 40% by weight of all the tertiary amino groups in the polyurethane are quaternized, and wherein

R_1 is an alkyl group containing 2 to 10 carbon atoms, R_3 is an aliphatic hydrocarbon chain which may be interrupted by one or more —O—, —S— and/or —NCH_3 groups;

said polyurethane having an average molecular weight of 10,000 to 60,000.

3,877,946

PHOTOGRAPHIC ELEMENT

Nobuo Tsuji; Tatsuya Tajima, and Yoshinori Tsuchiya, all of Minami Ashigaramachi, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara-shi, Kanagawa, Japan

Filed Jan. 19, 1972, Ser. No. 219,179

Claims priority, application Japan, Jan. 19, 1971, 46-1321

Int. Cl. G03c *1/78*

U.S. Cl. 96—87 R 14 Claims

1. A photographic element comprising a support having thereon at least one layer consisting essentially of gelatin, a nonionic water-soluble polymer which is photographically compatible with said gelatin and a polymer which is a phase-separation inhibitor for said gelatin and said nonionic water-soluble polymer, said polymer comprising 50 mole % of vinyl acetate, (50 - X) mole % of maleic acid and X mole % of a half alkyl ester maleic acid, wherein X is 0 X 50 and the alkyl group in said half alkyl ester has 1 to 4 carbon atoms, wherein the proportion of said gelatin, said nonionic water-soluble polymer and said polymer is 5 to 70, 90 to 15 and 5 to 15 by weight, respectively, said polymer being a phase-separation inhibitor.

3,877,947

PHOTOGRAPHIC ELEMENT

Nobuo Tsuji; Tatsuya Tajima, and Yoshinori Tsuchiya, all of No. 210, Nakanuma, Minami Ashigara-machi, Ashigara-Kamigun, Kanagawa, Japan

Division of Ser. No. 219,179, Jan. 19, 1972. This application Apr. 3, 1973, Ser. No. 347,523

Claims priority, application Japan, Jan. 19, 1971, 46-13211

Int. Cl. G03c *1/78*

U.S. Cl. 96—87 R 21 Claims

1. A light-sensitive photographic element comprising a support having thereon at least one silver halide emulsion layer which consists essentially of silver halide, gelatin, a nonionic water-soluble polymer which is photographically compatible with said gelatin and a polymer which is a phase-separation inhibitor for said gelatin and said nonionic water-soluble polymer, said polymer comprising 50 mole percent of vinyl acetate (50 − X) mole percent of maleic acid and X mole percent of a half alkyl ester of maleic acid, wherein X is 0 X 50 and the alkyl group in said half alkyl ester has 1 to 4 carbon atoms, wherein the proportion of said gelatin, said nonionic water-soluble polymer and said polymer is about 5 to about 70 percent by weight, about 90 to about 15 percent by weight and about 5 to about 15 percent by weight, respectively.

3,877,948

PHOTOSENSITIVE PRINTING COMPOSITION

Teruhiko Yonezawa, and Masaru Watanabe, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 29, 1972, Ser. No. 284,517

Claims priority, application Japan, Sept. 2, 1971, 46-67711

Int. Cl. G03f *7/04, 7/08, 7/10*

U.S. Cl. 96—93 5 Claims

1. A photosensitive printing composition consisting essentially of a (1) water soluble alkylene oxide polymer having a molecular weight ranging from about 100,000 to 10,000,000, (2) a polycarboxylic acid or polycarboxylic acid salt forming a water insoluble associate with said alkylene oxide polymer and (3) a photosensitizing agent selected from the group consisting of a diazo compound, a bichromate salt and an alkyl halide.

3,877,949

PHOTOGRAPHIC MATERIAL FOR THE SILVER DYESTUFF BLEACHING PROCESS

Alfred Frohlich, Marly, and Hansrolf Loeffel, Berne, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

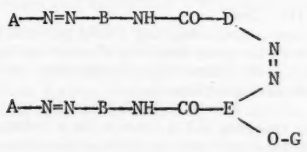
Continuation-in-part of Ser. No. 284,801, Aug. 30, 1972, abandoned, which is a division of Ser. No. 798,792, Feb. 12, 1969, abandoned. This application Sept. 20, 1973, Ser. No. 399,207

Claims priority, application Switzerland, Feb. 15, 1968, 2253/68

Int. Cl. G03c 1/10

U.S. Cl. 96—99 5 Claims

1. Photographic material for the silver dyestuff bleaching process that contains on a support at least one silver halide emulsion layer and in at least one layer a trisazo dyestuff of the formula



wherein each A denotes a benzene or naphthalene residue which is unsubstituted or substituted by a halogen atom or an alkyl, alkoxy, nitro or acetylamino group and contains 1 to 3 sulphonic acid groups, each B denotes a benzene residue which is unsubstituted or substituted by at most 2 halogen atoms, or alkyl, alkoxy, hydroxyalkoxy, alkoxyalkoxy, acylamino, carboxyacylamino, carboxyalkyl, carboxy or phenoxy groups or denotes a naphthalene residue, and wherein D denotes a benzene or naphthalene residue or a triazole residue, E denotes a benzene residue and G denotes a hydrogen atom or an alkyl group containing 1 to 5 carbon atoms, D and E each are unsubstituted or substituted by a halogen atom or an alkyl, alkoxy or phenyl group, the residues D and E —O—G being different from one another —O—G being bound to E in 2- or 4-position with relation to the azo group, A—N=N—B—NH—CO— being bound to D in non-adjacent position with relation to the azo group and A—N=N—B—NH—CO— being bound to E in 3-position with relation to the azo group.

3,877,950

PHOTOSENSITIVE GOLD COMPOSITIONS

John James Felten, Newark, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 21, 1974, Ser. No. 453,341

Int. Cl. G03c 1/58

U.S. Cl. 96—115 R 32 Claims

1. A gold conductor composition comprising finely divided gold and an inorganic binder therefor dispersed in a photosensitive vehicle, said vehicle comprising, by weight

a. 15–45 parts of a polymer having an inherent viscosity, in chloroform at 25°C., in the range of 0.15 to 0.95, said polymer being selected from the class consisting of polymethylmethacrylate, polyethylmethacrylate, and mixtures thereof,

b. 55–85 parts of a solvent for polymer (a), said solvent being selected from the class consisting of dihydroterpineol, benzyl alcohol, tetralin, and mixtures thereof,

c. a monomer selected from the class consisting of di-, tri-, and tetra-ethyleneglycoldiacrylate and mixtures thereof, the weight of monomer (c) being 3–20% of the total weight of polymer (a) plus solvent (b),

d. a photoinitiator for monomer (c) in an amount effective to initiate polymerization thereof.

3,877,951

INSECTICIDE VARNISH

Leon Pojurowsky, Colayrac-Saint-Cirq Lot-et-Garonne, France, assignor to Sogeref, Agen, Lot-et-Garonne, France

Filed Nov. 3, 1972, Ser. No. 303,472

Claims priority, application France, Nov. 5, 1971, 71.39852

Int. Cl. C09d 5/14

U.S. Cl. 106—15 AF 4 Claims

1. In a process for the production of a varnish having contact insecticidal activity and utilizable as a wall covering, comprising mixing an insecticide selected from the group consisting of organo-chlorine insecticides, organo-phosphorus insecticides, carbamate insecticides and mixtures thereof with a varnish selected from the group consisting of the fatty type, the vinyl type and the acryl type, the improvement consisting essentially of:

mixing 1–12% by weight of said insecticide at 15°–80°C. with a polar organic solvent compatible with said insecticide, said organic solvent being selected from the group consisting of butanol, xylene, toluene and isobutyl acetate, to provide a mixture having polarity and surface tension characteristics to effect migration thereof to the surface of said varnish; and

incorporating 15–45% by weight of said resulting mixture, at ambient temperature, into said varnish in the form of an emulsified varnish based compatible with said polar solvent to provide a varnish having contact insecticidal activity upon the evaporation of said solvent and the drying of said varnish after application to a support, the insecticide being oriented toward the surface of the resulting film through the action of the surface tension of the product and the polarity of the solvent.

3,877,952

FLAME-PROOFING AGENTS, ESPECIALLY FOR USE WITH CELLULOSIC MATERIALS

Kurt Dahmen, Rheydt, and Alois Kunschner, Krefeld, both of Germany, assignors to Chemische Fabrik Stockhausen & Cie, Bakerpfad, Germany

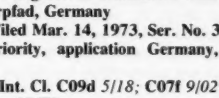
Filed Mar. 14, 1973, Ser. No. 341,187

Claims priority, application Germany, Mar. 18, 1972, 2213274

Int. Cl. C09d 5/18; C07f 9/02, 9/24

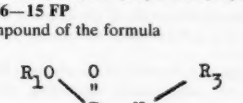
U.S. Cl. 106—15 FP 43 Claims

1. A compound of the formula



(I)

or



(II)

wherein, R_1 and R_2, which may be the same or different, each represents an alkyl, alkoxyalkyl or haloalkyl radical,

R_3 represents a mono- or multi-halogenated alkyl radical, and

R_4 represents a mono- or multi-halogenated alkyl radical, which may be the same as or different from that represented by R_3, or an alkyl or alkenyl group,

and wherein for R_1 and R_2, the alkyl, alkyl residue of the alkoxy group and the haloalkyl each contain up to 6 carbon atoms, and for R_3 and R_4, the haloalkyl, alkyl and alkenyl each contain up to 6 carbon atoms.

3,877,953
NIOBIUM PENTOXIDE-CONTAINING BOROSILICATE GLASSES

Heinz Broemer, Hermannstein, and Norbert Meinert, Wetzlar, both of Germany, assignors to Ernst Leitz GmbH. Optische Werke, Wetzlar, Germany

Filed Nov. 27, 1972, Ser. No. 309,804

Int. Cl. C03c *3/08*

U.S. Cl. 106—54 **22 Claims**

1. A niobium pentoxide-containing borosilicate glass composition having an index of refraction (n_e) between 1.5410 and 1.7942, an Abbe value (ν_e) of between 23.5 and 49.9 and being characterized by a high degree of chemical resistance, consisting essentially of

A. from about 30% to about 42% by weight of the combined glass-forming oxides SiO_2 and B_2O_3, wherein the SiO_2 content of said combined amount comprises between 22% and about 30% by weight and the B_2O_3 content of said combined amount comprises between about 8% and about 14% by weight;

B. between about 9% and about 22% by weight of K_2O;

C. and a component selected from the group consisting of i.) between about 37% and about 53% by weight of Nb_2O_5 and ii.) from about 37% to about 58% by weight of a combination of Nb_2O_5 and a further component, wherein the Nb_2O_5 content in said combined amount comprises between about 2% and about 48% by weight and said additional component in combination with the Nb_2O_5 is selected from the group consisting of

a. an amount of an oxide of the element Li, Mg, Al or Bi, said amount not substantially exceeding about 10% by weight.

b. an amount of an oxide of the element Na or Te, said amount not substantially exceeding about 20% by weight;

c. an amount of an oxide of the element Ca, Sr, Ba, Zn, Cd, Pb, In, La or Sb, said amount not substantially exceeding about 30% by weight;

d. an amount of TiO_2, said amount not substantially exceeding about 35% by weight;

e. an amount of Ta_2O_5, said amount not substantially exceeding about 38% by weight;

f. an amount of a fluoride of the element Li, Na, Ca or Al, said amount not substantially exceeding about 10% by weight;

g. an amount of a fluoride of the element Mg or Sr, said amount not substantially exceeding about 20% by weight;

h. an amount of a fluoride of the element Ba or Pb, said amount not substantially exceeding about 30% by weight;

i. an amount of KHF_2, said amount not substantially exceeding about 30% by weight; and

j. an amount of K_2TiF_6, said amount not substantially exceeding about 30% by weight.

3,877,954
POROUS MOULDINGS

Bernd Wöstefeld, Hamburg, Germany, assignor to Metastein Forschungsgesellschaft mbH

Filed May 2, 1972, Ser. No. 249,723

Claims priority, application Germany, May 3, 1971, 2121574; Mar. 28, 1972, 2215047; Apr. 18, 1972, 2218662; June 19, 1971, 2130540

Int. Cl. C04b *21/00*

U.S. Cl. 106—75 **23 Claims**

1. Method for the manufacture of porous molded bodies, comprising the steps of heating a mixture containing crushed crystalline silicate material and alkali silicates in the weight ratio of 2 to 6:1, and 15percent water by weight of dry substance in a closed vessel at 140° to 500°C avoiding the vapor phase to produce a transformation product, drying and crushing and transformation product, charging the transformation product into a mold and heating the transformation product at 700° to 900°C.

3,877,955
COSMETIC COMPOSITIONS

Gregoire Kalopissis, 64, Rue Vauvenargues, Paris, and Guy Vanlerberghe, Rue des Ecoles, Montjay-La-Tour, Villevaude par Clay-Souilly 77, both of France

Division of Ser. No. 186,524, Oct. 4, 1971, which is a continuation-in-part of Ser. No. 846,929, Aug. 1, 1969, Pat. No. 3,666,671, which is a continuation-in-part of Ser. No. 780,300, Nov. 29, 1968, Pat. No. 3,578,719, which is a continuation-in-part of Ser. No. 544,095, April 21, 1966, abandoned. This application Mar. 16, 1973, Ser. No. 341,853

Claims priority, application Luxembourg, Apr. 23, 1965, 48458; Nov. 22, 1965, 49902; Apr. 6, 1966, 50850; France, Dec. 1, 1967, 67.13071

Int. Cl. C08h *17/04*

U.S. Cl. 106—266 **8 Claims**

1. A composition comprising a solid pulverulent material selected from the group consisting of barium sulfate, titanium oxide, iron oxide, Guimet blue and aluminum particles and a compound having the formula

$$R_1O—C_2H_3O(CH_2OH)]_nH \qquad \text{(III)}$$

where the repeating unit is linear, n has a statistical average value greater than 1 and equal to or less than 10, R_1 is a hydrocarbon radical derived from a member selected from the group consisting of aliphatic and alicyclic alcohols having from eight to 30 carbon atoms, said compound being present in amounts of 1–25 percent based on the weight of said pulverulent material.

3,877,956
STABILIZATION OF AQUEOUS SOLUTIONS FROM HYDROLYZABLE ORGANOSILANES

Siegfried Nitzsche; Ewald Pirson, and Michael Roth, all of Burghausen, Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

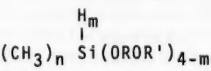
Filed July 24, 1972, Ser. No. 274,390

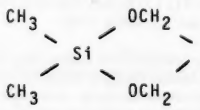
Claims priority, application Germany, July 22, 1971, 2136745

Int. Cl. C09k *3/00*

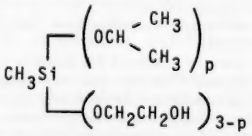
U.S. Cl. 106—287 SB **7 Claims**

1. An aqueous solution obtained from a water soluble hydrolyzable organosilane selected from the class consisting of silanes of the formula



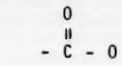


and

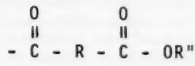


wherein R is selected from the groups consisting of divalent hydrocarbon radicals and divalent hydrocarbonoxy radicals, R′ is selected from the group consisting of hydrogen, monova-

lent hydrocarbon radicals having from 1 to 6 carbons atoms,



and



where R'' is a monovalent hydrocarbon radical having from 1 to 6 carbon atoms, R''' is selected from the group consisting of R'', hydrogen and a salt-forming cation, P is equal to 0.1 to 2, *n* is 1 or 2 and *m* is 0 or 1, and from about 0.05 to about 10 percent by weight based on the weight of the silane of a monocarboxylic acid having from 2 to 6 carbon atoms.

3,877,957

PIGMENT COMPOSITION

Gordon Frank Bradley, Paisley, and David Price, Beith, both of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 156,466, June 24, 1971, abandoned. This application Aug. 6, 1973, Ser. No. 385,802

Claims priority, application United Kingdom, June 26, 1970, 31054/70

Int. Cl. C08h *17/14*

U.S. Cl. 106—288 Q **7 Claims**

1. A pigment composition comprising a first pigment selected from the group consisting of arylamide, diarylamide and naphthol azo pigments having precipitated on the surface thereof a second pigment which differs from the first pigment and is also selected from the group consisting of arylamide, diarylamide and naphthol azo pigments, said second pigment being present in an amount ranging from 95:5 to 5:95 parts by weight of said first pigment.

3,877,958

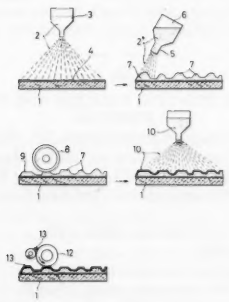
METHOD OF MANUFACTURING A DECORATIVE PANEL HAVING AN ETCHED PATTERN FORMED THEREON

Yasuji Ishii, 2-2-1, Kunika-dori, Fukiai-ku, Kobe-shi, Hyogen-ken, Japan

Filed Feb. 23, 1973, Ser. No. 335,222

Int. Cl. B44c *1/20, 1/22, 5/00*

U.S. Cl. 427—262 **1 Claim**



1. A method of producing a decorative panel having an etched pattern formed on its surface, comprising the steps of: preparing a paste-like paint by mixing epoxy resin with a 50 to 200 mesh size powder of stone;

spraying a thin film of the paint onto the surface of a given substrate to form a roughened surface having a fine uneveness thereon;

drying the roughened surface;

spraying a paint of the same material as the first mentioned paint spotwise onto the roughened surface to form a dot pattern of coarse uneveness thereon;

subsequently cutting off only the top portions of the dot pattern to provide flat-cut surfaces; applying a thin film of a non-coloured transparent acrylic urethane lacquer containing reflective metal powder all over the roughened surface and the cut dot pattern; and

finishing the roughened surface including the cut dot pattern by coating only the flat-cut surfaces in the dot pattern with a coloured acrylic urethane lacquer.

3,877,959

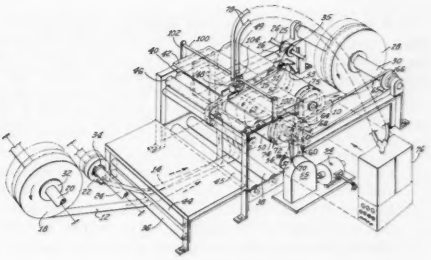
METHOD OF FABRICATING SEAMING TAPE

Sigmond Weiss, 1330 N. Gardner, Apt. No. 109, Hollywood, Calif.

Continuation-in-part of Ser. No. 833,074, June 13, 1969, abandoned. This application June 1, 1970, Ser. No. 42,376

Int. Cl. B44c *1/02*

U.S. Cl. 427—172 **3 Claims**



1. In a method of fabricating a tape wherein a heated hot-melt adhesive is applied to a traveling backing strip to form a layer of the adhesive thereon,

the improvement to form projections in the adhesive layer, including the steps of

partially cooling the adhesive layer through the backing strip to form a hardened stratum of the adhesive coating contiguous to the backing strip;

drawing the tape around the outer circumference of a roll having recesses in the outer circumferential surface thereof with the adhesive coating against the periphery of the roll at the recesses and while the adhesive is in a heated soft state, and

maintaining the tape under tension to force the soft adhesive into the recesses of the roll while the hardened stratum of the adhesive coating resists deformation by the roll and thereby limits the extent to which the heated soft adhesive enters the recesses of the roll,

whereby hardened projections are formed in the adhesive coating which correspond to the recesses in the roll with the projections interconnected to each other and to the backing strip through the hardened stratum of the adhesive coating in the area contiguous to the backing strip.

3,877,960
METHOD OF METAL COATING PARTICLES

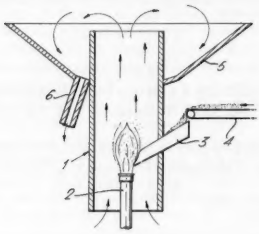
Walter Knoss, Kirchheimbolanden, Germany, assignor to Ballotini Europe Deutschland GmbH, Kirchheimbolanden, Germany

Filed Sept. 15, 1972, Ser. No. 289,617

Claims priority, application United Kingdom, Mar. 13, 1969, 13345/69; Jan. 1, 1970, 40/70; Jan. 1, 1970, 41/70; Jan. 1, 1970, 42/72

Int. Cl. B44d *1/02*

U.S. Cl. 264—15 4 Claims



1. A method of discontinuously applying a coating metal to the surfaces of substrate particles of another material with the use of a heated zone and a zone that is cooler relative to the temperature of said heated zone, comprising the steps of:

a. forming a mixture of particles of said coating metal and said substrate particles wherein a major portion by weight of said mixture is constituted by said substrate particles,

b. passing said mixture into a stream of hot gas to form said mixture into a loose condition in said heated zone and to effect heating of said particles of said mixture and to melt at least some of said coating metal particles so that said melted metal particles will form spots of a metal coating at a multiplicity of spaced places distributed over the entire surface of the particle,

c. causing said spot-coated particles to pass while maintained in loose condition by said hot gas stream, from said heated zone to said cooler zone, wherein said coating spots solidify, and

d. subsequently collecting said spot-covered substrated particles.

3,877,961
METHOD FOR INCREASING THE ADHESIVE STRENGTH OF LAYERS APPLIED BY THERMAL SPRAYING

Eggert Tank, Fellbach, and Franz Pigisch, Beutelsbach, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Germany

Filed Dec. 18, 1972, Ser. No. 315,993

Claims priority, application Germany, Dec. 17, 1971, 2162699

Int. Cl. C23c *3/00*

U.S. Cl. 427—191 27 Claims

1. A method of increasing the adhesive strength of a ceramic layer to a metallic base which comprises increasing the surface of the metallic base by applying a monogranular layer of metal granules to said base, the individual granules of said layer having free gaps therebetween to provide many successive height differences on the surfaces of said base, and by sintering said monogranular layer to secure said granules onto said base, and then thermally spraying a layer of ceramic onto said monogranular layer.

3,877,962
SUBSTRATE COATING COMPOSITION AND PROCESS

Lynn J. Taylor, Haslett, Mich., and John D. Grier, Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Dec. 18, 1972, Ser. No. 316,124

Int. Cl. C03c *17/10*

U.S. Cl. 427—375 6 Claims

2. The invention of claim 1 wherein the fugitive vehicle is a low-molecular-weight liquid polymer consisting of at least one polymer selected from polyethers, poly(alkyl methacrylates), methacrylate copolymers, polycarbonates, polyesters, polyisobutylene, polystyrene, poly(alkyl vinyl ethers), styrene/alpha-methylstyrene copolymers, vinyl toluene/alpha-methylstyrene copolymers, and olefin-sulfur dioxide copolymers.

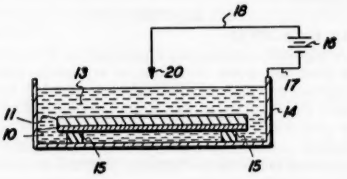
3,877,963
REVERSAL LIQUID DEVELOPING USING A DEVELOPMENT ELECTRODE AND CORONA CHARGING

Masamichi Sato, c/o Fuji Film Co. Ltd., 105 Oaza Mizonuma, Osaka, Japan

Continuation of Ser. No. 322,599, Jan. 10, 1973, abandoned, which is a continuation of Ser. No. 111,065, Jan. 29, 1971, abandoned. This application Jan. 28, 1974, Ser. No. 437,080

Int. Cl. B41m *5/20*; G03g *13/10, 13/22*

U.S. Cl. 96—1 LY 3 Claims



1. A method for reversal development of electrostatic latent images in a liquid developer comprising providing an electrostatographic recording member having an imaging surface and a rear surface, forming an electrostatic latent image on said imaging surface, immersing said recording member into a liquid developer, positioning a development electrode parallel and spaced from said imaging surface, developing said image by applying corona ions to said rear surface of said recording member by a corona discharge electrode disposed outside said liquid developer, said corona ions having a polarity opposite to the polarity of said electrostatic latent image whereby said ions causes the contacting of said imaging surface with toner particles in conformance to said electrostatic latent image.

3,877,964
TRANSFER PRINTING PROCESS AND PRODUCTS THEREOF

Richard John Orman, Welwyn Garden City, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Nov. 1, 1973, Ser. No. 411,844

Claims priority, application United Kingdom, Nov. 16, 1972, 52938/72

Int. Cl. D06p *5/00*

U.S. Cl. 428—195 9 Claims

1. A process for forming a polymeric material comprising polymerising the continuous phase of an emulsion having an aqueous disperse phase and a continuous phase of acrylic monomer which comprises methyl methacrylate to form a water-filled cellular material, removing the water from at least a part of the surface of the material, and decorating the cellular material by heating a transfer print containing at least one sublimable dye adjacent said surface to a temperature above

the sublimation temperature of the dye so as to vaporise and transfer the dye to said surface.

3,877,965

CONDUCTIVE NYLON SUBSTRATES AND METHOD OF PRODUCING THEM

Robert Broadbent, Philadelphia; Sidney Melamed, Elkins Park, and Robert G. Minton, Cornwells Heights, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 76,245, Sept. 28, 1970, abandoned. This application June 19, 1972, Ser. No. 264,097

Int. Cl. C23c *3/02*

U.S. Cl. 427—304 **4 Claims**

1. A process for producing a silver-coated fibrous nylon substrate which comprises subjecting a fibrous nylon substrate to a sensitizing polyvalent metal salt bath, then washing the substrate with water, subjecting it to a bath of deionized water, removing it from the deionized water and squeezing excess water out of it, then allowing the resulting wet fibrous substrate to stand, with periodic agitation, within an aqueous solution consisting essentially of water, a silver salt dissolved therein, 3 to 3.5 mols of ammonia per mol of silver salt, 0.025 to 0.1 percent, based on the solution, of an anionic surfactant, formaldehyde, and sufficient acid to bring the solution to a pH of about 8.4 to about 9.4 prior to introduction of the substrate, rinsing the silver-coated fibrous substrate, and drying it, the time of the silvering step being sufficient to deposit a substantially continuous coating of silver on the substrate fiber without changing the modulus characteristics of the fiber.

3,877,966

PROCESS FOR ENAMELLING WIRE

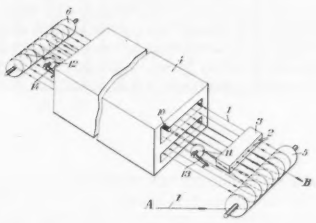
Roland A. Goyffon, Macon, France, assignor to Societe Mafit Manufacture de Fils Isoles Taurus, Macon, France

Division of Ser. No. 46,791, June 16, 1970, Pat. No. 3,710,756, which is a continuation-in-part of Ser. No. 660,256, Aug. 14, 1967, abandoned. This application Nov. 15, 1972, Ser. No. 306,833

Claims priority, application France, Aug. 22, 1966, 66.73791

Int. Cl. B44d *1/42*; **H01b** *3/30*

U.S. Cl. 428—379 **9 Claims**



1. A process for continuously enamelling wire with a polymerizable enamel containing a solvent, comprising

continuously moving said wire axially of itself at high speed and repeating cyclically the sequence of steps of

heating the wire to a drying temperature between the temperature of the enamel at the time of its application and the polymerization temperature of the enamel;

then applying said enamel inside a closed applicator zone to the wire at said drying temperature;

then passing the wire through surroundings which are at a lower temperature than said drying temperature so that the direction of heat flow is from the wire towards the surroundings thereby ensuring the free evaporation of substantially all of the solvent without premature polymerization of the surface of the layer of enamel; and

then passing said wire through an oven at said polymerization temperature to polymerize said enamel layer thereby enabling high-speed production of the enamelled wire while avoiding micro-crack formation due to emission of residual solvent through the enamel.

3,877,967

METHOD OF IMPROVING THE STRENGTH OF ADHESION OF CELLULOSIC COVERINGS TO PHENOLIC RESIN FOAM MATERIALS

Hans Junger, Emil-Mueller-Str. 21, 521 Troisdorf; Franz Weissenfels, Am Grafenkrauz 17, 52 Siegburg, and Wolfgang Pungs, Paul-Mueller-Str. 1, 521 Troisdorf, all of Germany

Filed Oct. 30, 1972, Ser. No. 302,377

Claims priority, application Germany, Nov. 2, 1971, 2154346

Int. Cl. B44d *1/092*

U.S. Cl. 428—314 **8 Claims**

1. A method for improving the strength of adhesion of a fibrous covering material composed of cellulosic fibers to a phenolic resin foam which comprises pretreating the fibrous covering material with:

1. A fluid paraffin hydrocarbon having a flash point above 150° C and a solidification point of at least 105°C;
2. A solution of a hydrocarbon named under (1) above;
3. A fluid, unctuous or solid chlorinated paraffin having a chlorine content of 10 to 75% by weight;
4. A chlorinated paraffin under paragraph (3) above in solution form or melted form; or
5. A mixture of hydrocarbons and chlorinated hydrocarbons under paragraphs (1) and (3) above,

on the side of the covering material which is to be in contact with the phenolic resin foam, applying theragainst a foamable phenolic resin mixture, foaming said phenolic resin mixture and hardening and setting the foam to obtain an article of a phenolic resin and a fibrous covering material having disposed in the region of the interface at least one of the hydrocarbons or chlorinated hydrocarbons described in paragraphs (1) through (5) above.

3,877,968

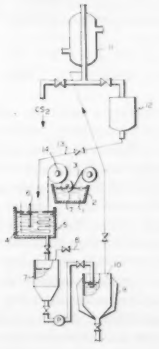
FINISHED PAPER FOR CASINGS AND PROCESS OF PREPARING SAME

Hiroo Maeno, Osaka, and Yoshiyuki Matsumoto, Agawa, both of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed June 30, 1972, Ser. No. 268,108

Int. Cl. B44d *1/44*

U.S. Cl. 162—176 **9 Claims**



1. Method of preparing paper suitable for use as a casing, comprising the steps of

A. impregnating said paper with an alkali cellulose xanthate solution;

B. treating the impregnated paper with lower mono-alcohol thereby to regenerate cellulose; and

C. washing the resulting paper with water and thereafter drying.

3,877,969

COATED GLASS BOTTLES

Tetsujiro Tatsumi; Reiji Miyamoto, both of Chiba; Yutaka Matsui, Shizuoka; Seiji Kazama, Kawanishi; Tadao Takemura, Nara, and Hikoyoshi Kanayama, Chiba, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka and Mitsui Polychemicals, Co., Ltd., Tokyo, Japan

Filed May 21, 1973, Ser. No. 362,502

Claims priority, application Japan, July 19, 1972, 47-72953

Int. Cl. B32b *17/10;* **C03c** *17/32*

U.S. Cl. 428—216 **7 Claims**

1. A coated glass bottle comprising a bottle having on the surface thereof a first coating layer of an olefine copolymer containing OH groups or OH and COOH groups in its molecule and a second coating layer of a thermoplastic polyurethane directly thereon.

3,877,970

SELECTIVE CURING OF MULTIPLE LAYERS OF POLYARYLENE SULFIDE COATINGS

James T. Edmonds, Jr., and Jennings P. Blackwell, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sept. 26, 1973, Ser. No. 400,906

Int. Cl. B44d *1/14;* **C08g** *43/02*

U.S. Cl. 427—379 **10 Claims**

1. A method for coating a substrate with an arylene sulfide polymer composition comprising: applying at least one base coat of said arylene sulfide polymer containing a fluorocarbon polymer of sufficiently low molecular weight to exhibit some flow under ASTM D 1238 melt flow test at 380°C with a 5000 g weight, and curing said thus formed base coat at a first elevated temperature within the range of 225° to 610°F for a time, t in minutes, no more than an amount represented by the equation $t = (-T/20) + 62$ wherein T is an integer corresponding to said first elevated temperature in °F, so as to give an incomplete cure; and thereafter applying a top coat of arylene sulfide polymer containing a fluorocarbon polymer and subjecting the thus-coated substrate to a second elevated temperature within the range of 650° to 900°F for a time in minutes, t', greater than that represented by the formula $t' = (-2T'/25) + 77$ wherein T' is an integer corresponding to said second elevated temperature in °F, to give a relatively complete cure.

3,877,971

PHOTOCURABLE POLYENE-POLYTHIOL COMPOSITIONS CONTAINING THE ADDUCT OF DIALLYLMALATE AND TOLUENE DIISOCYANATE

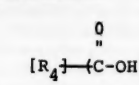
James L. Guthrie, Ashton, and Francis J. Rendulic, Ellicott City, both of Md., assignors to W. R. Grace and Co., New York, N.Y.

Division of Ser. No. 409,615, Oct. 25, 1973, which is a continuation-in-part of Ser. No. 209,369, Dec. 17, 1971, Pat. No. 3,787,303. This application Aug. 14, 1974, Ser. No. 497,427

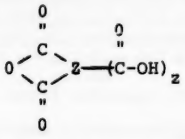
Int. Cl. B41j *1/10;* **B05c** *5/00;* **B01j** *1/12, 1/10*

U.S. Cl. 427—53 **6 Claims**

1. A photocurable lacquer composition comprising (A) a polythiol component containing at least 2 —SH groups per molecule; (B) as a polyene component, the diadduct of diallyl malate and toluene diisocyanate; the mole ratio of ene to thiol being from about 0.2:1 to about 5:1; (C) from about 0.0005 to about 50 percent by weight of the composition of a photocuring rate accelerator component; (D) from 1 to about 50 parts by weight per 100 parts by weight of the polyene-polythiol combination of a normally solid, solvent soluble polyester component having a molecular weight from about 500 to about 100,000 prepared by reacting (i) a polybasic acid having the general formula



where R_4 is a saturated or unsaturated hydrocarbyl group having valence of x and from 2 to about 21 carbon atoms and x is at least 2 or (ii) a polybasic acid anhydride having the general formula



where z is 0 or 1, Z is a saturated or unsaturated hydrocarbyl group having from about 2 to about 12 carbon atoms and a valence of 2 when z is 0 and a valence of 3 when z is 1 with (iii) a polyhydric alcohol having the general lformula $[R_8—OH)_Y$ where R_8 is a saturated or unsaturated hydrocarbyl or oxyhydrocarbyl group having a valence of y and from 2 to about 30 carbon atoms and y is at least 2.

3,877,972

METHOD FOR COATING INTERIOR OVEN SURFACES TO PROVIDE EASY SOIL REMOVAL

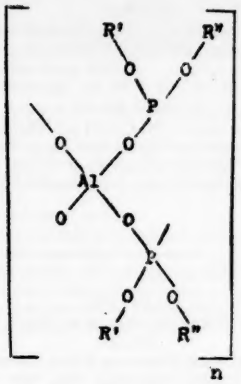
Sharon L. Arnold, Bay City, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 170,976, Aug. 11, 1971, abandoned. This application Nov. 15, 1972, Ser. No. 306,795

Int. Cl. B05b *13/06*

U.S. Cl. 427—384 **1 Claim**

1. The method of providing an oven with an interior surface from which heat degraded food residues are easily removed comprising the steps of (1) applying a continuous coating to the surface to be protected of a solution of (a) from 0.1 to 0.5 weight percent of a metal-oxygen-phosphorous polymer of the formula:



wherein R′ and R″ are independently selected from alkyl groups containing from 1 to 25 carbon atoms and *n* is an integer greater than 1 and (b) a volatile organic solvent and (2) evaporating the solvent from the coating.

3,877,973

TREATMENT OF PERMEABLE MATERIALS.

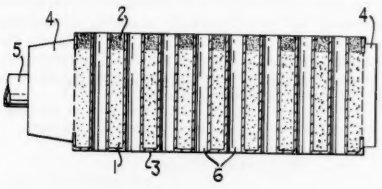
Frank Ernest George Ravault, Nechells, Birmingham, England, assignor to Foseco International Limited, Birmingham, England

Filed Dec. 29, 1972, Ser. No. 319,765

Claims priority, application United Kingdom, Jan. 14, 1972, 1931/72

Int. Cl. B44d *1/092*

U.S. Cl. 264—44 **7 Claims**



1. A method of making an article of highly permeable material having on at least one surface of the article an impermeable facing layer, said method comprising: forming a pattern of organic foam material; lining a surface of the organic foam material with a layer of absorbent material; impregnating the pattern and lining with a liquid slurry of ceramic material; removing surplus slurry and drying and heating the assembly to form a ceramic foam article of large-celled structure and high permeability having a layer of fine-pored structure on the surface corresponding to the surface of the organic foam which was lined with absorbent material; applying a glazing frit to the layer of fine-pored structure; and heating to cause the frit to fuse to produce an impermeable facing.

7. A method of making a gas burner block which comprises forming a pattern of organic foam material in the shape of a block having one face constructed of finely pored foam, and having channels running across the block, lining the channels with absorbent material, impregnating the foam and absorbent material with a slurry of ceramic material, removing surplus slurry, drying and firing the block, providing the walls of the channels and at least one face of the block, with a fine-pored surface, applying a glaze from a slurry to the fine-pored face and the interior walls of the channels, and drying and firing the block to a temperature sufficient to fuse the glaze to an impermeable coating.

3,877,974

FLAME RETARDANTS FOR BLENDS OF NATURAL AND SYNTHETIC FIBERS

Vladimir Mischutin, Union City, N.J., assignor to White Chemical Corporation, Bayonne, N.J.

Filed Oct. 25, 1972, Ser. No. 330,731

Int. Cl. C09k *3/28*; **C09d** *5/18*

U.S. Cl. 428—290 **9 Claims**

1. A method of rendering flammable textile materials flame retardant which comprises:

treating said materials with a flame retardant composition consisting essentially of a brominated, organic aromatic or cyclic compound and a metallic oxide, in aqueous dispersion, in admixture with an aqueous emulsion of a suitable high molecular weight polymeric adhesive binder,

said brominated compound and said metallic oxide being solids at room temperature,

substantially totally insoluble in water, having been reduced to an average particle size below 2 microns, and being in weight ratio of 1:4 parts of brominated compound to 0.1:1 part of metallic oxide,

said high molecular weight polymeric binder being present in amount sufficient to secure said brominated organic compound and metallic oxide flame retardant composition to said material, and drying and curing said treated material, wherein the total amount of flame retardant deposited on said material is effective to reduce the flammability of the textile and is durable to laundering and dry cleaning.

3,877,975

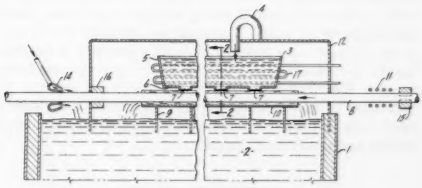
METALLIC COATING OF METAL TUBES AND SIMILAR WORK PIECES

Anthony John Raymond, 20429 Attica Rd., Olympia Fields, Ill. 60461

Filed Apr. 12, 1973, Ser. No. 350,535

Int. Cl. C23c *1/00*

U.S. Cl. 427—345 **10 Claims**



1. The method of continuously applying a molten metal galvanising coating to a metal tube or other work piece which must pass through the coating metal in a straight line inside a housing, said housing having an entrance opening and an exit opening equipped with a guide for the work piece, comprising heating the metal in a kettle to provide a body of liquid metal, pumping the molten metal into a reservoir located within the housing and above said kettle, allowing a controlled stream of molten metal to flow from said reservoir, passing the work piece through the housing along a path beneath said reservoir to allow the molten metal to flow over said work piece, disposing a splash plate beneath said work piece to control the flow of molten metal around the said work piece, allowing free flow of the molten metal outward of the end of the splash plate adjacent the exit opening and positioning the guide at the exit

opening forward of the adjacent end of the splash plate so that the work piece will unobstructedly drag molten metal from the splash plate during its transit from the splash plate to the exit opening guide.

3,877,976

METHOD FOR TREATING WOOD MATERIALS WITH LIGNOSULFONIC ACIDS

Harry S. Olson, Woodland Rd., Houghton, Mich. 49931, and Bruce A. Haataja, Rt. 1, Box 18, Lake Linden, Mich. 49945

Continuation of Ser. No. 227,292, Feb. 17, 1972, abandoned, which is a continuation of Ser. No. 886,387, Dec. 18, 1969, abandoned. This application May 4, 1973, Ser. No. 357,368

Int. Cl. B27k *3/02, 3/34;* **B44d** *1/26*

U.S. Cl. 427—317 **10 Claims**

1. A method for treating wood to impart a color thereto comprising

impregnating said wood with an aqueous solution containing a spent sulfite liquor from which 40 to 100% of the base ions have been removed to obtain free lignosulfonic acids; and

heating said impregnated wood at a temperature within the range of about 145° to about 450°F for a time sufficient to polymerize said lignosulfonic acids and thereby impart a permanent, water-resistant color to said wood.

3,877,977

FLOATING RUST PREVENTING FILM COATED STEEL MEMBERS FOR BUILDINGS AND STRUCTURES

Shozo Watanabe, 12-66, Komatsu-cho, Hirohata-ku; Minoru Kitayama, 3-29, Azuma-cho, Horohata-ku; Shigenori Yamadera, 32, Kitagawara-cho, Hirohata-ku; Yasuyuki Taniguchi, 14, Katsuhara-cho, Katsuhara-ku, and Susumu Yamaguchi, 4-85, Kamiya-cho, all of Himeji, Japan

Continuation-in-part of Ser. No. 197,440, Nov. 10, 1971, abandoned. This application May 6, 1974, Ser. No. 467,566

Int. Cl. B32b *15/08;* **B44d** *1/36*

U.S. Cl. 428—336 **5 Claims**

1. A weatherproof low alloy steel member to be used as a material for buildings and structures, the surface of which is covered with a film for accelerating the formation of a compact and stable rust on the surface of said steel, while preventing the formation of floating rust on the surface of the steel while said stable rust is being formed, said film consisting essentially of at least 1% manganese dioxide; 30–70% of an oxide pigment, or a mixture of oxide pigments, including said manganese dioxide; 0.05 to 10% sulfur; and the rest being an organic film forming component selected from the group consisting of an acrylic resin, an alkyd resin, a phthalic acid ester resin, a polystyrene resin, a cumarone resin, a cyclized rubber and a rubber chloride.

3,877,978

SEMIPERMEABLE MEMBRANES

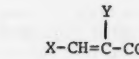
Seymour S. Kremen, San Diego; Gerald E. Foreman, Del Mar, and John M. Chirrick, Cardiff, all of Calif., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Mar. 27, 1974, Ser. No. 455,461

Int. Cl. B01d *39/04*

U.S. Cl. 210—23 **30 Claims**

1. A method of improving the rejection performance of semipermeable reverse osmosis membranes comprising incorporating into the membrane an effective amount of a supplemental polymer consisting of a copolymer of vinyl acetate and one or more members selected from the group having the formula:



wherein X is hydrogen, lower alkyl, or carboxyl, wherein Y is hydrogen, lower alkyl or CH_2COOH and wherein Z is hydrogen or lower alkyl and wherein said copolymer is prepared from a mixture including at least about 50 mole percent vinyl acetate, whereby the rejection performance of the membrane is improved.

3,877,979

PROCESS OF TREATING WOOD AGAINST STAIN AND DECAY

Trevor P. Clark, North Vancouver, British Columbia, Canada, assignor to C.B.M. Enterprises Ltd., New Westminster, British Columbia, Canada

Filed Sept. 8, 1972, Ser. No. 287,537

Int. Cl. B27k *3/00;* **B44d** *1/26, 1/44*

U.S. Cl. 427—337 **12 Claims**

1. The process of treating wood against stain, decay, fungi and insect attack, which comprises applying to the surfaces of wood a first aqueous solution comprising a chlorophenol salt selected from the group consisting of the salts of ammonium, morpholine, sodium and potassium, from about 0.057 to about 10 percent of the active ingredients, in an emulsion of resin-like material selected from the group consisting of rosin, polyvinyl acetate, rubber and hydrocarbon resin in from about 0.1 to about 40 percent concentration of the resin-like material, said emulsion being such as to result in a solution which is normally stable but is unstable when mixed with predetermined salts, said aqueous mixture of chlorophenol salt and resin-like material penetrating the surface fibres of the wood as an emulsion; and applying to the surfaces of said treated wood a second solution containing at least one of such predetermined salts comprising water soluble salt of an organic or inorganic acid in concentration from about 0.004 percent up to saturation and which is such as to immediately precipitate the chlorophenol salt as substantially insoluble compounds and at the same time to break the emulsion and precipitate the resin-like material within the fibres of the wood, said resin-like material binding the chlorophenol compounds to the fibres to prevent leaching thereof from the wood.

3,877,980

METHODS OF PRODUCING PHOSPHOSILICATE GLASS PATTERNS

Barry Forester Martin, and Edward David Roberts, both of Salfords, near Redhill, Surrey, England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 17, 1973, Ser. No. 324,394

Claims priority, application United Kingdom, Jan. 18, 1972, 2350/72; May 4, 1972, 20759/72; May 4, 1972, 20760/72

Int. Cl. B44d *1/18*

U.S. Cl. 357—7 **35 Claims**

1. A method of producing a phosphosilicate glass pattern on a substrate, said method comprising forming a layer of a polysiloxane and a phosphorus containing compound on a substrate, subjecting said layer to irradiation according to a predetermined pattern in order to effect the solubility of the portion of said layer corresponding to said predetermined pattern in a developer, treating said irradiated layer with said developer to thereby remove the portion of said layer corresponding to said pattern and then heating said resultant patterned layer to thereby convert said polysiloxane and phosphorus compound layer to a phosphosilicate glass.

3,877,981
METHOD OF ELECTROLESS PLATING

Anthony Francis Arnold, Ringoes, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 30, 1973, Ser. No. 355,720
Int. Cl. B44d *1/18*
U.S. Cl. 427—305 **6 Claims**

1. In a method of electrolessly depositing a metal catalyzed by a film of palladium, on a substrate surface, comprising:

depositing a thin, discontinuous film of palladium on said surface,

rinsing said surface, and

electrolessly depositing a metal on said surface, the improvement comprising

rinsing said surface, after depositing said film of palladium, in an aqueous solution containing a wetting agent that does not interfere with the subsequent electroless deposition of said metal on said surface.

3,877,982
MONOLITHIC ACOUSTIC SURFACE WAVE AMPLIFIER DEVICE AND METHOD OF MANUFACTURE

Larry A. Coldren, Palo Alto, and Gordon S. Kino, Stanford, both of Calif., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 243,434, April 12, 1972, abandoned. This application Dec. 6, 1973, Ser. No. 422,494
Int. Cl. B44d *1/14*
U.S. Cl. 427—87 **1 Claim**

1. Method of making a monolithic acoustic surface wave amplifier device, said method including the steps of

A. heating a $LiNbO_3$ delay line piezoelectric substrate in vacuum to a temperature about 550° C. and then cooling to about 400° C.

B. depositing a thin barrier layer of about 300 angstroms in thickness of silicon oxide on the piezoelectric substrate,

C. depositing a film of about 500 angstroms in thickness of InSb at about 350° C. on the barrier layer,

D. overcoating with a thin film of silicon oxide, and

E. annealing in argon at about 450° C.

3,877,983
THIN FILM POLYMER-BONDED CATHODE

Boghos Karnig Hovsepian, Newark, N.J., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del.

Filed May 14, 1973, Ser. No. 360,939
Int. Cl. H01m *43/00*
U.S. Cl. 136—6 LN **12 Claims**

1. In a high energy density cell comprising an active light metal anode, a cathode and a nonaqueous electrolyte, wherein the improvement consists essentially of,

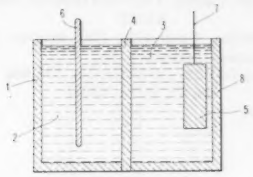
the cathode having a thin conductive, imperforate metal substrate in contact with and bonded to particulate, cathodically active material and optionally, conductivity aid, said bonding being with a water-soluble organic polymer in the amount of from 0.1 to 15 percent by weight of the cathodically active material, conductivity aid and polymer, said polymer selected from the group consisting of carboxymethylcellulose, hydroxyethylcellulose, soluble starch, polyvinyl alcohol, and protein-derived casein and gelatin, said cathodically active material being selected from at least one member of the group consisting of sulfur, the oxides, sulfides and halides of copper, lead, silver, cadmium, zinc, iron, cobalt and nickel, and the oxides of vanadium, tatanium and tungsten,

the polymer having no more than about 0.1 percent solubility in the electrolyte, based on the weight of electrolyte, the particulate material and the polymer comprising a substantially homogeneous conductive film.

3,877,984
ALKALI METAL-METAL CHLORIDE BATTERY

John J. Werth, Princeton, N.J., assignor to ESB Incorporated, Philadelphia, Pa.

Filed Apr. 24, 1974, Ser. No. 463,520
Int. Cl. H01m *35/00*
U.S. Cl. 136—6 F **13 Claims**



1. A secondary battery comprising in combination:

a. a negative reactant consisting essentially of a molten alkali metal;

b. a positive reactant comprising metal chloride;

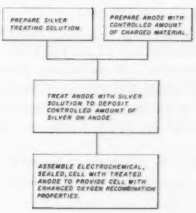
c. a solid member separating the negative and positive reactants, said member being selectively-ionically-conductive with respect to cations of said molten alkali metal negative reactant; and

d. a molten alkali metal chloraluminate electrolyte on the positive reactant side of the solid member, wherein the alkali metal of the negative reactant is also present in the alkali metal chloraluminate.

3,877,985
CELL HAVING ANODE CONTAINING SILVER ADDITIVE FOR ENHANCED OXYGEN RECOMBINATION

Guy G. Rampel, Gainesville, Fla., assignor to General Electric Company, Owensboro, Ky.

Continuation-in-part of Ser. No. 154,488, June 18, 1971, abandoned. This application July 27, 1973, Ser. No. 383,066
Int. Cl. H01m *43/04*
U.S. Cl. 136—24 **4 Claims**


PREPARE SILVER TREATING SOLUTION.
PREPARE ANODE WITH CONTROLLED AMOUNT OF CHARGED MATERIAL
TREAT ANODE WITH SILVER SOLUTION TO DEPOSIT CONTROLLED AMOUNT OF SILVER ON ANODE.
ASSEMBLE ELECTROCHEMICAL, SEALED, CELL WITH TREATED ANODE TO PROVIDE CELL WITH ENHANCED OXYGEN RECOMBINATION PROPERTIES.

1. A nickel-cadmium secondary, electrochemical cell having enhanced oxygen recombination properties comprising:

a. a casing;

b. a positive electrode disposed in said casing;

c. a negative electrode disposed in said casing, said positive and negative electrodes comprising:

1. a conductive substrate;

2. a porous plaque of sintered nickel powder disposed on said substrate; and

3. an active material inpregnated in the pores of said porous plaque, the active material of said positive and negative electrodes in a discharged state consisting essentially of $Ni(OH)_2$ and $Cd(OH)_2$, respectively;

d. a porous separator disposed between said positive and negative electrodes;

e. an alkaline electrolyte filling a portion of said casing;

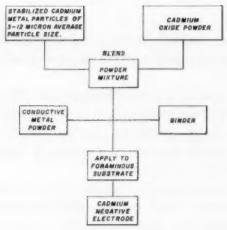
f. a small deposit of catalytically active silver particles dispersed throughout the pores of said porous plaque of the negative electrode.

3,877,986

RECHARGEABLE CELL HAVING IMPROVED CADMIUM NEGATIVE ELECTRODE AND METHOD OF PRODUCING SAME

Henry A. Catherino, Gainesville, Fla., assignor to General Electric Company, Owensboro, Ky.

Filed July 25, 1972, Ser. No. 275,086
Int. Cl. H01m *43/04*
U.S. Cl. 136—24 **9 Claims**



1. An improved cadmium negative electrode comprising a mixture of cadmium oxide powder; generally spherically shaped cadmium metal particles formed by condensing cadmium metal vapors in the presence of oxygen, said particles having an average particle size of approximately 3–12 microns and stabilized with a minor amount of CdO; and a binder; and applied to a foraminous substrate to form an electrode.

3,877,987

METHOD OF MANUFACTURING POSITIVE NICKEL HYDROXIDE ELECTRODES

Manfred August Gutjahr, Wendlingen, Neckar, Germany; Rudolf Schmid, Perchtoldsdorf near Vienna, Austria, and Klaus Dieter Beccu, Troinex, Geneve, Switzerland, assignors to Battelle Memorial Institute, Carouge, Geneve, Switzerland

Filed June 5, 1974, Ser. No. 476,723
Claims priority, application Switzerland, June 7, 1973, 8240/73
Int. Cl. H01m *43/04*
U.S. Cl. 136—29 **7 Claims**

1. A method of manufacturing a positive nickel hydroxide electrode for galvanic cells comprising the steps of providing a highly porous core structure of organic material with a fibrous or reticular texture having a large surface with a double coating by successively spraying molten zinc and nickel onto the said core structure so as to cover said structure uniformly first with a protective coating of zinc and then with an outer coating of nickel, while substantially retaining the initial texture and porosity of said core structure, subjecting the resulting coated structure to a thermal treatment which provides sintering of the said nickel coating, removal of the organic core material and evaporation of the zinc, so as to thereby produce a strongly consolidated highly porous support structure consisting substantially of nickel, and having a texture and porosity corresponding substantially to the initial core structure, and depositing the nickel hydroxide mass in the pores of the said support structure.

3,877,988

LITHIUM-METAL TELLURIDE ORGANIC ELECTROLYTE CELL

Arabinda N. Dey, Needham, and Per Bro, Andover, both of Mass., assignors to P. R. Mallory and Co., Inc., Indianapolis, Ind.

Filed Mar. 21, 1973, Ser. No. 355,861
Int. Cl. H01m *23/02*
U.S. Cl. 136—83 R **12 Claims**

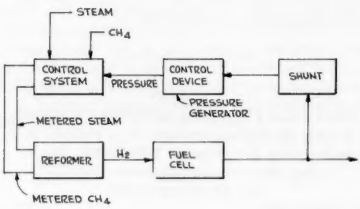
1. A high energy density cell comprising a positive electrode selected from the group consisting of the tellurides of silver, copper, iron, cobalt, nickel, mercury, thallium, lead, and bismuth and the mixtures thereof; a negative electrode comprising a light metal selected from the group consisting of Li, Na, K, Be, Mg, Ca and Al, said electrodes being disposed in an electrolyte comprising an organic solvent selected from the group consisting of tetrahydrofuran, N-nitrosodimethylamine, dimethyl sulfite, propylene carbonate, gamma-butyrolactone, dimethyl carbonate, dimethoxyethane, acetonitrile, dimethyl sulfoxide, dimethyl formamide, and the mixtures thereof, and having dissolved therein soluble salts of the light metals, said salts selected from the group consisting of the perchlorates, hexafluorophosphates, tetrafluoroborates, tetrachloroaluminates, and hexafluoroarsenates of the light metals.

3,877,989

POWER SYSTEM AND AN ELECTROCHEMICAL CONTROL DEVICE THEREFOR

Elliot Isadore Waldman, West Hartford, and John Richard Aylward, Vernon, both of Conn., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed Sept. 13, 1971, Ser. No. 179,962
Int. Cl. H01m *27/12, 27/14*
U.S. Cl. 136—86 B **3 Claims**



1. A power system comprising in combination an electrical power source and an electrochemical control device said device comprising a consumable metal anode comprising lead, a gas cathode comprising a non-consumable electrode electrochemically reactive to hydrogen; an electrolyte mixture of lead perchlorate and perchloric acid in contact with and separating said anode and cathode, and a gas cavity having hydrogen gas therein and having a predetermined and controlled volume in fluid communication with said anode, means for setting said device at a predetermined gas pressure in said cavity corresponding to a predetermined potential imposed on said device, said combination being constructed and arranged whereby the IR from said power source is imposed upon said anode and cathode of said electrochemical control device through a shunt, said device being constructed and arranged to undergo a pressure change in said gas cavity as a function of IR change imposed upon said anode and cathode by said source to actuate a pressure force transmitter.

3,877,990

METHOD OF SLOWING ESCAPE OF CHLORINE FROM METAL-CHLORINE BATTERY

Alfred F. Laethem, Sterling Heights, and Peter Carr, Utica, both of Mich., assignors to Occidental Energy Development Company, Madison Heights, Mich.

Filed July 2, 1973, Ser. No. 375,568
Int. Cl. H01m *29/04*, *1/08*
U.S. Cl. 136—86 A 5 Claims

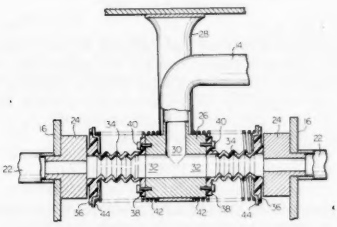
1. A method of slowing the escape of chlorine from a metal-chlorine battery system, containing chlorine hydrate, of a motor vehicle which comprises blanketing said chlorine and its source with a foam, comprising an aqueous medium and a chlorine neutralizing agent to chemically convert the chlorine to a less toxic state or condition, released from a pressure-resistant dispensing container.

3,877,991

ELECTRIC AUTOMOBILE BATTERY GAS DISCHARGE TUBE CONNECTOR

Tadashi Fujikawa, Tokyo, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Jan. 29, 1974, Ser. No. 437,717
Claims priority, application Japan, Jan. 29, 1973, 48-12604
Int. Cl. H01m *1/06*
U.S. Cl. 136—177 4 Claims



1. A connector for a battery system having a battery compartment, a battery casing detachably mounted within the battery compartment, a battery mounted in the battery casing, a discharge tube communicating with the interior of the battery to pass gas therefrom, and an exhaust tube to pass gas from the discharge tube to the atmosphere, said connector being arranged to connect the discharge tube to the exhaust tube and comprising;

a connector body fixedly mounted within the battery compartment and having an outlet communicating with the exhaust tube and an inlet;

a flexible tube extending externally from said inlet of said connector body and having a resilient flange at its end;

biasing means urging said resilient flange externally from said connector body; and

a casing flange fixed to the battery casing and communicating with the discharge tube;

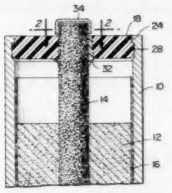
the battery casing and said connector being arranged within the battery compartment so that said inlet, said flexible tube, said resilient flange and said casing flange are in substantial axial alignment and said resilient flange is urged into sealing engagement with said casing flange to provide connection between the discharge tube and the exhaust tube.

3,877,992

PRIMARY DRY CELL WITH FAIL-SAFE VENT

Lewis F. Urry, North Olmsted, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed Aug. 1, 1973, Ser. No. 384,446
Int. Cl. H01m *1/06*
U.S. Cl. 136—107 10 Claims



1. A primary dry cell comprising, in combination, a cylindrical metal container having an open end, a central carbon electrode rod protruding beyond the open end of said container and a seal closure for sealing the open end of said container, said closure comprising an annular insulating cover having its inner peripheral surface fitting tightly around the protruding end of said carbon electrode rod forming a juncture therebetween which is tightly sealed except for a gas-venting passageway extending through said juncture for releasing high internal gas pressure at a predetermined high temperature level, said gas-venting passageway being defined by an indentation within at least one of said cover and said carbon electrode rod located at said juncture and by a portion of the other of said cover and said carbon electrode rod which coincides with said indentation whereby part of the walls of said passageway are formed by said carbon electrode rod which is thermally stable at said predetermined high temperature level, said gas-venting passageway being closed by a normally solid fusible sealant having a softening or melting point which substantially corresponds to said predetermined high temperature level.

3,877,993

DRY CELL WITH CORROSION INHIBITOR

Stuart M. Davis, Madison, Wis., assignor to ESB Incorporated, Philadelphia, Pa.

Filed Nov. 29, 1973, Ser. No. 420,015
Int. Cl. H01m *21/00*
U.S. Cl. 136—107 14 Claims

9. In a galvanic cell comprising a container, a zinc anode, a depolarizer mix, a means for electronically separating the anode from the mix, an aqueous electrolyte in ionic contact with the anode and the mix, the improvement which comprises: within the container and in contact with the electrolyte an inhibitor, the inhibitor comprising polymerized vinyl-benzyl-tri-methyl-ammonium-chloride.

3,877,994

CATALYTIC PASTE AND ELECTRODE

Jacob Chottiner, McKeesport, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 25, 1972, Ser. No. 300,618
Int. Cl. H01m *13/02*
U.S. Cl. 136—121 19 Claims

12. An electrode according to claim 11 wherein said plaque is composed of about 2 to about 100 layers of diffusion-bonded nickel fibers.

3,877,995
POTASSIUM BORATE GLASS COMPOSITIONS

Charles A. Levine, and Floris Y. Tsang, both of Concord, Calif., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 276,592, July 31, 1972, abandoned. This application Dec. 3, 1973, Ser. No. 420,984
Int. Cl. H01m 3/02
U.S. Cl. 136—146 **5 Claims**

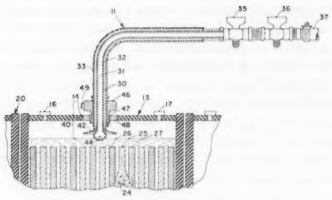
1. An amorphous potassium borate glass system of the formula $K_2O.\ (2+a)\ B_2O_3.\ (b-c-e)\ KX.\ c/2\ M(X')_2.\ dY.\ e/3\ M'(X'')_3$ wherein, in the formula,

$-0.5 < a < 2$;
$0 < b \leq (1+a/2) + 0.3$, when X is F;
$0 < b \leq (1+a/6) + 0.1$, when X is Cl or Br;
$0 \leq c \leq b$;
$0 \leq d \leq 1$;
$0 \leq e \leq (b-c)$;
M is Mg, Ca, Sr or Ba;
M′ is Al or Ga;
Y is SiO_2 or $\frac{1}{2}\ R_2O_5$; and
X, X′ and X″ are, independently, Cl, Br or F.

3,877,996
BATTERY HOT SHORT CONTROL METHOD AND MEANS

Laurence A. Belletete, Amesbury, Mass., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 9, 1973, Ser. No. 358,750
Int. Cl. H01m 45/02
U.S. Cl. 136—160 **2 Claims**



1. The method of controlling a high capacity battery cell which has developed an internal short comprising:

flooding over the burnable material in said cell by introducing a non-electrolyte liquid into the cell;

maintaining a continuous flow of said non-electrolyte to said cell at a rate sufficient to appreciably reduce the temperature of the electrolyte in said cell; and

concurrently evacuating liquids from said cell at a rate which maintains a selected liquid level in said cell,

said continuous supply to and removal of non-electrolyte operating to continuously dilute the electrolyte in said cell while constantly removing heat energy generated by said internal short until said short has been effectively controlled,

said selected liquid level determined by the position of the orifice through which liquids are evacuated.

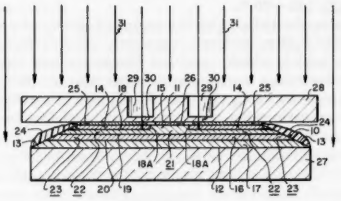
3,877,997
SELECTIVE IRRADIATION FOR FAST SWITCHING THYRISTOR WITH LOW FORWARD VOLTAGE DROP

Jerry L. Brown, Greensburg, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 20, 1973, Ser. No. 343,070
Int. Cl. H01l 7/54
U.S. Cl. 148—1.5 **5 Claims**

1. A method of decreasing the turn-off time of a thyristor without correspondingly increasing the forward voltage drop of the device comprising the steps of:

a. masking against radiation between about 60 and 95% of the surface area of conducting portions of the thyristor spaced from gating portions of the thyristor; and



b. thereafter irradiating surface portions of a PN junction formed between cathode-emitter and cathode-base regions of the thyristor and about 5 to 30% of the adjacent surface area of conducting portions of the thyristor.

3,877,998
TREATMENT OF METAL SURFACES WITH AQUEOUS SOLUTION OF MELAMINE-FORMALDEHYDE COMPOSITION

Donald Joseph Guhde, Cleveland, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Filed June 11, 1973, Ser. No. 368,783
Int. Cl. G23f 7/00
U.S. Cl. 148—6.15 **10 Claims**

1. A method of treating a phosphated ferrous metal, galvanized or aluminum object without the application of chromium chemicals thereto which comprises contacting the surface of said object with an aqueous acidic solution consisting essentially of at least one melamine-formaldehyde composition, and subsequently drying said object.

3,877,999
HYDRATION-DISINTEGRATION OF COBALT-RARE EARTH ALLOY CONTAINING MATERIAL

Theodore B. Lerman, and Charles M. McFarland, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed June 3, 1974, Ser. No. 475,900
Int. Cl. C21d 1/04
U.S. Cl. 148—105 **4 Claims**

1. A substantially self-regulating process for hydrating and disintegrating a reaction product cake comprised of alloy particles substantially or completely surrounded by calcium and/or a calcium compound selected from the group consisting of calcium oxide, calcium hydride, and calcium nitride, said alloy particles consisting essentially of rare earth metal and a metal selected from the group consisting of cobalt, iron, manganese and alloys thereof, which comprises providing a hydration zone having a gas inlet at one end portion and a reacted gas outlet at substantially the opposite end portion, providing a collection zone in association with said hydration zone, selecting a support screen having holes through which material of a desired size or smaller passes, placing said support screen within said hydration zone substantially between said gas inlet and said reacted gas outlet, placing said reaction product cake on said support screen, passing an incoming water vapor-carrying gas through said gas inlet at a rate which at least envelops said reaction product cake reacting with said calcium or said calcium compound therein to form substantially calcium hydroxide causing a significant volume increase which disintegrates said reaction product cake, said incoming water vapor-carrying gas initially having a temperature ranging from about 0°C to about 70°C and a relative humidity

ranging from about 5% to 100%, said reaction product cake being substantially inert to the gas component of said water vapor-carrying gas, passing the resulting reacted gas through said reacted gas outlet, said disintegrated cake falling through said holes in said support screen substantially upon disintegrating to said desired size or smaller to said collection zone away from substantial contact with said incoming water vapor-carrying gas.

3,878,000

RECOVERY OF COBALT-RARE EARTH ALLOY PARTICLES BY HYDRATION-DISINTEGRATION IN A MAGNETIC FIELD

Charles M. McFarland; Theodore B. Lerman, and Alan C. Rockwood, all of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed June 3, 1974, Ser. No. 475,969
Int. Cl. C21d *1/04*
U.S. Cl. 148—108 **6 Claims**

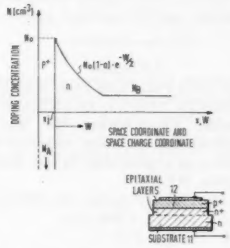
1. A process for hydrating and disintegrating a reaction product cake and recovering the magnetic portion thereof, said reaction product cake being comprised of magnetic alloy particles substantially or completely surrounded by calcium and/or a calcium compound selected from the group consisting of calcium oxide, calcium hydride and calcium nitride, said magnetic alloy particles consisting essentially of rare earth metal and a metal selected from the group consisting of cobalt, iron, manganese and alloys thereof, which comprises providing a substantially vertical reactor having a gas inlet at its lower end portion and an outlet at its upper end portion, placing said reaction product cake in said reactor substantially between said gas inlet and said outlet, passing a water vapor-carrying gas through said gas inlet to react with said calcium and/or said calcium compound causing a significant volume increase which disintegrates said reaction product cake, said water vapor-carrying gas initially having a temperature ranging from about 0°C to about 70°C and a relative humidity ranging from about 5% to 100%, said reaction product cake being substantially inert to the gas component of said water vapor-carrying gas, said water vapor-carrying gas being passed through said reactor at a rate which fluidizes said disintegrated cake within said reactor and until substantial conversion to calcium hydroxide is completed producing a substantially hydrated powder, providing means for generating a magnetic zone between said gas inlet and outlet a significant distance into a cross-section of the reactor encircling the inside wall thereof to a significant extent and being comprised of at least two magnetic poles of opposite polarity running the full length of said zone and substantially parallel to the associated inside wall of the reactor, said magnetic poles being rotatable or reversible, passing an inert gas through said inlet upwardly to fluidize said hydrated powder disassociating and carrying the calcium hydroxide through said outlet, said magnetic alloy particles of finer size carried by said fluidizing gas into said magnetic zone being caught by the poles which are rotated or reversed at a rate sufficient to significantly reverse the positions of the particles resulting in release of adherent calcium hydroxide leaving the finer-sized particles within said magnetic zone.

3,878,001

METHOD OF MAKING A HYPERSENSITIVE SEMICONDUCTOR TUNING DIODE

Gunter Olk, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Division of Ser. No. 359,708, May 14, 1973, abandoned, which is a continuation of Ser. No. 159,280, July 2, 1971, abandoned. This application Nov. 29, 1973, Ser. No. 420,158
Claims priority, application Germany, July 13, 1970, 2034717
Int. Cl. H01l *7/34, 7/44*
U.S. Cl. 148—186 **2 Claims**



2. A method for producing a hypersensitive tuning diode comprising the steps of doping a semiconductor body with a background doping concentration N_B of one conductivity type, diffusing a doped zone with a retrograded doping profile of the one conductivity type, and diffusing a heavily doped zone of the other conductivity type forming a p-n junction between the zone of the one conductivity type and the zone of the other conductivity type, the diode having desired values of

$$A = \frac{V_2 + V_0}{V_1 + V_0}$$

and $r = C_1/C_2$, wherein the ratio W_1/z is such that parameter $a = N_B/N_0$ is at a maximum value at least equal to $6.1 \cdot 10^{-3}$, the area of the p-n junction is minimized, V_0 being the offset voltage, A being the voltage variation between the voltages V_2 and V_1, C_1 being the capacitance at the voltage V_1, C_2 being the capacitance at the voltage V_2, r being the capacitance variation between the capacitances C_1 and C_2, and W_1 being the space charge width at the voltage V_1.

3,878,002

NITROGEN AND FLUORINE CONTAINING SOLID PROPELLANT COMPOSITIONS BASED ON ACRYLIC PREPOLYMER BINDERS

Mart G. Baldwin, Newtown, Pa., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation-in-part of Ser. No. 227,109, Sept. 24, 1962. This application June 24, 1969, Ser. No. 836,178
Int. Cl. C06d *5/06*
U.S. Cl. 149—19.3 **10 Claims**

1. A propellant composition comprising a cured intimate mixture of from about 30% to about 60% by weight solid, inorganic, oxidizing salt, and from about 8% to about 16% by weight of a polymer, said polymer being a reaction product of an acrylate or an alkyl acrylate with at least one of the compounds selected from the group consisting of an acrylic acid, an hydroxyl-containing acrylate and an hydroxyl-containing methacrylate, said acrylate being an acrylate of NF_2-containing polymers and said alkyl acrylate being selected from methyl, ethyl, butyl, and 2-ethylhexyl acrylates.

3,878,003

COMPOSITE DOUBLE BASE PROPELLANT WITH HMX OXIDIZER

Arthur Lo Presti, Hope, and Robert P. Baumann, Dover, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 16, 1960, Ser. No. 50,045
Int. Cl. C06d 5/06
U.S. Cl. 149—19.8 2 Claims

1. A solid propellant composition comprising, by weight, 50 percent cyclotetramethylene tetranitramine, 17.7 percent nitrocellulose, 22.1 percent nitroglycerin, 5.2 percent triacetin, 0.5 percent diethylphthalate, 2.0 percent basic lead beta resorcylate, 2.0 percent basic cupric salicylate, 0.5 percent 2-nitrodiphenylamine, and 0.02 percent carbon black.

3,878,004

POLYMERIZATION PROCESS FOR MAKING NITRO COMPOUNDS, USEFUL AS EXPLOSIVES

Mortimer J. Kamlet, Silver Spring, Md., and Richard R. Minesinger, Berrien Springs, Mich., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 13, 1972, Ser. No. 233,837
Int. Cl. C06b 3/00
U.S. Cl. 149—88 6 Claims

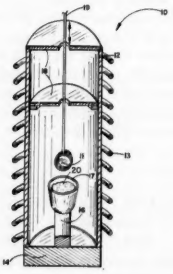
1. In the method of polymerizing 4,4-dinitropimeloyl chloride and 2,2,8,8-tetranitro-4,6-dioxa-1,9-nonanediol the improvement comprising carrying out said polymerization in 1,2-dichloroethane as solvent.

3,878,005

METHOD OF CHEMICALLY POLISHING METALLIC OXIDES

Robert G. Warren, Anaheim, and Eugene C. Whitcomb, Mission Viejo, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed June 18, 1973, Ser. No. 371,197
Int. Cl. C23f 3/00; C23c 13/04
U.S. Cl. 156—2 8 Claims



1. A method of chemically polishing metallic oxide substrates comprising the steps of:

forming a molten flux from constituents suitable for dissolving metallic oxides wherein the constituents are boric anhydride and one or more of the group consisting of lead monoxide, lead fluoride, barium oxide, barium fluoride, iron oxide, lithium carbonate and vanadium pentoxide and wherein forming the molten flux comprises mixing the constituents of the flux at a first temperature suitable for establishing a molten homogeneous solution and bringing the molten solution to thermal equilibrium at a second temperature suitable for providing a desired dissolution rate of the substrate material;

moving the substrate at a controlled rate toward the molten flux to heat the substrate without thermal shock;

immersing the substrate in the molten flux for a sufficient time to strip a predetermined thickness of material from the substrate; and

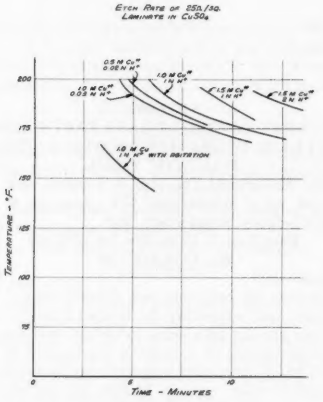
withdrawing the substrate from the flux at a controlled rate to cool the substrate without thermal shock.

3,878,006

SELECTIVE ETCHANT FOR NICKEL/PHOSPHORUS ALLOY

James M. Rice, Sepulveda, Calif., assignor to The Mica Corporation, Culver City, Calif.

Filed Oct. 26, 1973, Ser. No. 410,226
Int. Cl. C23f 1/02
U.S. Cl. 156—3 7 Claims


Etch Rate of 250/30 Laminate in CuSO4
0.5 M Cu++ 0.05 N H+
1.0 M Cu++ 1 N H+
1.5 M Cu++ 1 N H+
1.5 M Cu++ 2 N H+
0.5 M Cu++ 0.05 N H+
1.0 M Sn++ 1 N H+ with agitation
Temperature - °C
Time - Minutes

1. A novel etching composition for the selective removal of resistive nickel or nickel alloy in the presence of copper which comprises:

$CuSO_4 \cdot 5H_2O$ — 0.5 M to 1.5 M

H_2SO_4 (conc.) — 0.02 M to 2 M

3,878,007

METHOD OF DEPOSITING A PATTERN OF METAL PLATED AREAS ON AN INSULATING SUBSTRATE

Nathan Feldstein, Kendall Park, and Harold Bell Law, Princeton, both of N.J., assignors to RCA Corporation, New York, N.Y.

Division of Ser. No. 200,156, Nov. 18, 1971, Pat. No. 3,753,816. This application June 6, 1973, Ser. No. 367,541
Int. Cl. B29c 17/08
U.S. Cl. 156—11 8 Claims

1. A method of depositing a pattern of metal plated areas on an insulating substrate comprising:

depositing a relatively thin layer of a first metal having a relatively high degree of solubility in a particular etchant on a surface of said substrate, said first metal being catalytic to electroless deposition of a second metal to be subsequently deposited,

applying a layer of photoresist on said first metal layer, exposing and developing said photoresist to remove portions thereof so as to define a desired pattern on the surface of said first metal layer,

electrolessly depositing on said defined surface areas of said first metal layer, a relatively thick layer of said second metal, said second metal having a relatively low degree of solubility in said etchant,

removing the remaining portions of said photoresist, and treating the entire surface to be patterned with said etchant to remove only those areas of said first metal not covered with said second metal.

3,878,008

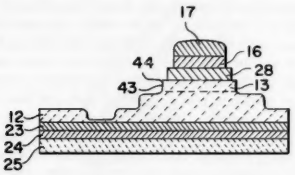
METHOD OF FORMING HIGH RELIABILITY MESA DIODE

K. Reed Gleason, Washington, D.C., and Marvin L. Bark, Baltimore, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 25, 1974, Ser. No. 445,375

Int. Cl. H011 *7/50*

U.S. Cl. 156—11 **8 Claims**



1. A method of producing a diced mesa semiconductor device comprising:

a. forming a semiconductor wafer having an active surface forming one of two opposed wafer surfaces, a first metal layer bonded to the active surface of said wafer and a second metal layer bonded to the surface of said first layer;

b. etching said second layer to form at least one first metal dot on the surface of said first layer;

c. depositing a metal contact button on said at least one metal dot;

d. etching a plurality of grid lines in said first layer and in said wafer to delineate a chip containing said at least one first metal dot;

e. etching said first layer to form a second metal dot concentric with said at least one first metal dot;

f. etching said wafer using said second metal dot as a mask to form a mesa and thin said wafer along said grid lines;

g. etching said second metal dot to a diameter about equal to the diameter of said at least one first dot using said first dot as a mask;

h. again etching the wafer using said dots as a mask whereby undercutting of the dots occurs;

i. etching said second dot so as to prevent metal overhang at the mesa edge;

j. etching said first dot using said button as a mask.

3,878,009

GLASS FIBER REINFORCED GYPSUM BUILDING COMPONENTS AND METHOD

Harold James William Payne, Whispering Pines, Raby Mere, Chester, England

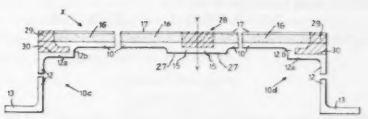
Division of Ser. No. 328,968, Feb. 2, 1973, Pat. No. 3,839,836. This application May 6, 1974, Ser. No. 463,306

Claims priority, application United Kingdom, Feb. 4, 1972, 5396/72

Int. Cl. E04c *1/10, 2/06*

U.S. Cl. 156—41 **2 Claims**

1. The method of making a roof deck unit having a glass fiber reinforced gypsum web, a depending tongue extending along a first longitudinal side and a depending bight portion extending along the second longitudinal side, said web being covered with an insulating layer of foamed plastics material, and having a water resistant finishing sheet applied to the top of the said insulating layer, comprising forming two units from glass fiber reinforced gypsum in a duplex structure with the said first longitudinal sides of each said web being integral and contiguous, the webs of the two units in said duplex structure having a plane upper surface extending uninterruptedly from the second side edge of one unit to the second side edge of the other unit in the duplex structure, applying the said insulating



layer uninterruptedly over the said plane upper surface and applying the said water resistant finishing sheet over the said insulating layer and thereafter removing three lengthwise strips of finishing sheet, insulating layer and glass fiber reinforced gypsum to form the offset for the tongues and to form the groove.

3,878,010

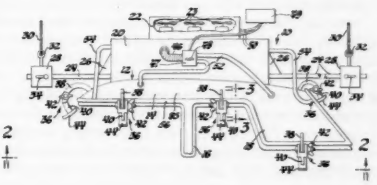
APPARATUS AND METHOD FOR ADHESIVELY BONDING A ROOF COVERING TO AN AUTOMOTIVE VEHICLE ROOF

John A. Zammit, Grosse Ile, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 25, 1974, Ser. No. 454,098

Int. Cl. E04f *13/00*

U.S. Cl. 156—71 **7 Claims**



1. An apparatus for adhesively bonding a roof covering to an automotive vehicle roof, the apparatus comprising:

a female mold substantially conforming to the shape of a vehicle roof to which the roof covering is to be bonded; a mat received by the mold and having projections extending away from the mold in spaced relationship to each other so as to define the general contour of the roof and to also define a network of spacing therebetween, the mat also defining a plurality of spaced apertures therethrough in communication with the network of spacing defined by the projections;

suction means for drawing a vacuum at the apertures in the mats to thereby also draw a vacuum in the network of spacing between the projections thereof so as to secure the roof covering to the mold in the configuration of the roof, the secured roof covering being placed over the roof by movement of the mold so that an adhesive between the roof and the roof covering provides a bond therebetween; and

means for supplying a pressurized gas to the roof covering through the apertures in the mat to thereby pressurize the bond and ensure adhesive bonding of the roof covering to the roof.

3,878,011

PILE FABRICS AND METHODS AND APPARATUS FOR THE PRODUCTION THEREOF

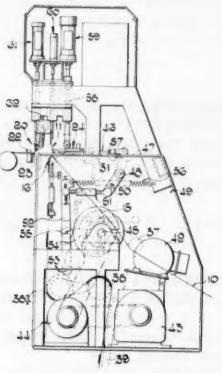
Herbert Henry Currell, and William Colin Bourne, both of Stourport-on-Severn, England, assignors to Bond Worth Limited, Stourport-on-Severn, Worcestershire, England

Filed Jan. 22, 1973, Ser. No. 325,801

Claims priority, application United Kingdom, Jan. 5, 1973, 675/73; Jan. 5, 1973, 676/73

Int. Cl. D04h *11/00;* **B32b** *5/08*

U.S. Cl. 156—72 **8 Claims**



1. A method of producing a pile fabric comprising the steps of:

a. feeding a preformed ground member carrying an adhesive coating on one of its faces along a feed path through a tuft attaching station, the adhesive having a composition such that its viscosity decreases on heating and being fed to the attaching station at a first temperature such that it is in a sufficiently sticky condition to adhere to yarn pressed into the adhesive,

b. feeding a row of tuft-forming lengths of pile yarn to said station from a source presenting yarn ends in a row,

c. pressing a first part of each tuft-forming length into the adhesive to attach said first part to the ground member, leaving a further part of each tuft-forming length to project from the adhesive coated ground member as a tuft,

d. feeding the ground member with said row of tuft-forming lengths adhered thereto along said path away from the attaching station,

e. causing the viscosity of the adhesive securing the tuft-forming lengths to the ground member to increase as the ground member with said row of tuft-forming lengths adhered thereto is fed away from the attaching station along said path to further secure the tuft-forming lengths, and

f. then temporarily raising the temperature of said adhesive securing the tuft-forming lengths to the ground member to a second temperature substantially higher than said first temperature to temporarily reduce the viscosity of the adhesive to enable the adhesive to penetrate the tufts and anchor them more securely.

3,878,012

DEVICE AND METHOD FOR FISHING ROD REPAIR

Lee F. Williams, Rt. 3, Box 89, Moses Lake, Wash. 98837

Filed Dec. 20, 1973, Ser. No. 426,530

Int. Cl. B32b *35/00*

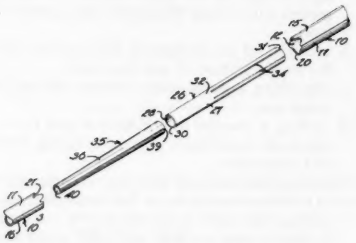
U.S. Cl. 156—94 **7 Claims**

1. A repair device for a hollow fishing rod of the type having a uniformly tapered exterior surface and a similarly tapered bore extending along a longitudinal central axis, a section of said rod having been broken into two separate pieces, the broken open ends being defined by complementary end edges along a fracture line about the section, with one of the pieces tapering from its end edge to an enlarged end and the remaining piece tapering from its respective end edge to a reduced end, said device comprising:

an elongated insert having an exterior surface tapered to match the taper of said bore and extending longitudinally along a central axis from an enlarged end to a reduced end, the cross-sectional diameters of said ends being respectively greater and smaller than the cross-sectional diameter of the bore at the fracture line, and further including a mid section between the enlarged and reduced ends having a cross-sectional diamter equal to the cross-sectional diameter of the bore at the fracture line; and

a slot extending longitudinally from the enlarged insert end to said mid section to allow radial compresssion of the enlarged end, thereby permitting said enlarged end to be placed within the bore of said one piece and located therein so the mid section is positioned along the end edge of said one piece with the reduced insert end protruding outwardly therefrom, whereby said remaining piece may be adjoined to said one piece by inserting said protruding reduced insert end into the broken open end of the remaining piece and butting the complementary end edges against each other.

4. A method for repairing a hollow fishing rod of a type having a uniformly tapered exterior surface and a similarly tapered bore extending along a longitudinal central axis, a



section of said rod having been broken into two separate pieces, the broken open ends of which are defined by complimentary end edges at a fracture line, one of the pieces being tapered from its broken open end to an enlarged end and the remaining piece being tapered from its respective broken open end to a reduced end, said method comprising the steps of:

compressing an enlarged end of an elongated insert having an exterior surface tapered to match the taper of said bore and extending longitudinally along a central axis from an enlarged end to a reduced end, the cross-sectional diameters of said ends being respectively greater and smaller than the cross-sectional diameter of the bore at said fracture line and further including a mid section between the enlarged and reduced ends, the mid section including a cross-sectional diameter equal to the cross-sectional diameter of the bore at the fracture line, said insert further having a slot extending longitudinally from the enlarged insert end to said mid section to thereby allow said radial compression of said enlarged end to a diameter less than the diameter of said bore at the fracture line;

inserting the enlarged end of said insert into the open end of said one piece;

positioning said insert longitudinally within the bore so the exterior surface of the insert fits flush with the walls of the bore with the reduced end of said insert protruding out-

wardly from the end edge of said one piece; and

inserting the reduced end of the insert into the open end of the remaining piece so the complementary end edges fit together along the fracture line.

3,878,013

VEHICLE TIRE WITH TIRE BEAD PLY MEANS AND METHOD FOR THE MANUFACTURE THEREOF

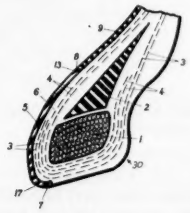
Erich Kresta, Perchtoldsdorf, Austria, assignor to Semperit Aktiengesellschaft, Vienna, Austria

Filed Nov. 6, 1972, Ser. No. 304,208

Claims priority, application Austria, Nov. 10, 1971, 9717/71

Int. Cl. B29h *17/12, 17/24*

U.S. Cl. 156—132 **7 Claims**



1. A method of manufacturing vehicle tire, comprising the steps of building-up a tire blank on a tire build-up drum, said tire blank having an inner wall and two bead regions, said inner wall defining the internally disposed surface of the vehicle tire, applying during the course of the tire build-up at the inner wall of the tire at both tire bead regions plies formed of a harder rubber mixture than the rubber mixture employed for other regions of the tire beads or the inner plate of the tire, or both, said rubber plies extending over at least that portion of each bead region confronting the tire build-up drum.

3,878,014

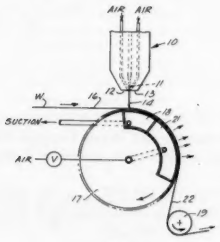
PROCESS FOR MATTING MELT BLOW MICROFIBERS

James J. Melead, Roscoe, Ill., assignor to Beloit Corporation, Beloit, Wis.

Filed Apr. 30, 1973, Ser. No. 355,901

Int. Cl. D04h *3/16*

U.S. Cl. 156—167 **5 Claims**



1. A process for making a non-woven laminar structure of melt-blown microfibers on a pre-formed porous web comprising the steps of continuously

passing a non-woven web under tension over a suction zone and then a pressure zone and supporting the web while passing over said zones,

providing a die head having a row of die openings therein for the passage of hot gas to attenuate molten, extruded resin as fibers to the suction zone,

extruding molten thermoplastic resin through said die openings in the die head and simultaneously passing a stream of hot gas immediately above and below said row of die openings to attenuate the molten, extruded resin as fibers extending generally perpendicular to the plane of the web,

drawing air at ambient temperatures uniformly through the web in the suction zone while simultaneously supporting the web,

then forcing air through the web at predetermined temperatures so adjusted as to achieve a composite matlike form at a reduced temperature relative to the temperature of passage of the web over the first zone and below the glass transition temperature of the fibers.

3,878,015

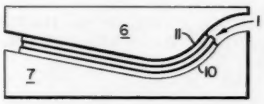
METHOD OF MOLDING CURVED VENEER LAMINATED STOCK

Ervin R. Johnston, Lenoir, N.C., assignor to Sterling-Bruce, Incorporated, Lenoir, N.C.

Filed Aug. 1, 1972, Ser. No. 277,121

Int. Cl. B27d *1/08, 3/00;* **B32b** *21/14*

U.S. Cl. 156—222 **4 Claims**



1. A method of manufacturing a laminated wood veneer stock comprising:

a. providing at least one innermost and two outermost wood veneer sheets each having a grain and two major surface areas;

b. coating said innermost sheet or sheets on both of said major surfaces thereof and one of the major surfaces of both of said outermost sheets with polyvinyl acetate;

c. assembling said coated veneer sheets into a pile so that said sheets have a polyvinyl acetate coating-to-coating relationship between all of said major surfaces, save for one surface of each said outermost veneer sheets, and the grain of such sheets extending in a common direction; and,

d. at room temperature, consolidating said pile into a composite of predetermined thickness by pressing same into final shape, for at least eighteen minutes, between first and second spaced-apart curved pressing surfaces which are non-conforming in closed contacting positions and which are so configured that all points on said first pressing surface are equidistant from corresponding opposite points on said second pressing surface when the spacing between said pressing surfaces is equal to said predetermined thickness of said composite, thereby conforming said veneer sheets to the configuration of said pressing surfaces.

3,878,016

PROCESS FOR PRODUCING SLICED VENEER

Takeshi Sadashige, Fuchū, Japan, assignor to Dantani Plywood Co., Ltd., Kitakyusuhu-shi, Fukuoka and Sadashige Fancy Plywood Industries Co., Ltd., Hiroshima, both of, Japan

Filed July 17, 1973, Ser. No. 379,962

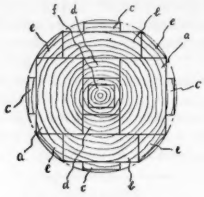
Claims priority, application Japan, July 18, 1972, 4772230

Int. Cl. B32b *31/18*

U.S. Cl. 156—265 **17 Claims**

1. A process for producing wood veneer comprising the steps of dividing a log into a plurality of individual flitches, smoothing the surfaces of the flitches which are subsequently to be joined, applying an adhesive to the smoothed surfaces of the flitches, joining said flitches at said adhesive-bearing surfaces to form a composite flitch, slicing said composite flitch

to the desired thickness to produce a veneer, and carrying out the above mentioned steps while maintaining the moisture



content of said wood flitches at or above the fiber saturation point.

3,878,017

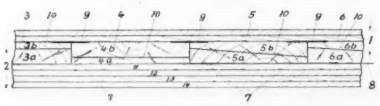
METHOD OF MAKING A DECORATIVE BUILDING PANEL OF LUMBER PLANKS AND LAMINATED VENEER PLIES

Roland Etzold, 487A Thompson Ave., Mountain View, Calif. 94040

Filed Jan. 3, 1972, Ser. No. 214,720

Int. Cl. B32b *31/18;* **B27d** *1/00;* **B32b** *7/06;* **E04c** *1/30;* **B32b** *3/10*

U.S. Cl. 156—266 **9 Claims**



1. The method of producing a decorative building panel, comprising the steps of

assembling individual lumber planks at least certain of which are of uneven thickness into pairs, so that the resulting pairs have the same thickness throughout their length and from pair to pair,

compiling an assembly by placing said pairs of planks edge to edge between a plurality of veneer plies coated with glue,

placing a paper glue line between the layer of lumber planks and the adjacent veneer plies, which will stick to both surfaces and prevent glue from striking through joints between the planks,

pressing the assembly in a press until the glue has set and the veneers are bonded to each other and to the planks, and removing the assembly from the press and separating it into two panels, thereby also separating the plank pairs, each panel showing one-half of each plank pair as part of its face.

3,878,018

METHOD OF MANUFACTURING STAMPING BLANKS

Jean Cospen, Cachan, and Bernard Baumann, Paris, both of France, assignors to Cebal GP, Paris, France

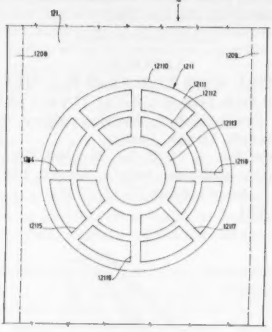
Filed June 16, 1972, Ser. No. 263,529

Claims priority, application France, June 16, 1971, 71.21783

Int. Cl. B32b *31/18, 15/08*

U.S. Cl. 156—267 **5 Claims**

1. In a method for the manufacture of stamping blanks formed of at least two continuous foils, at least one of which is a foil of a thermoplastic material, and at least one of which is a metal foil, wherein the portion of the foils forming the blank are at least temporarily adhered one to the other while the portion of the foils outside the blank are separable one from the other to enable recovery, comprising preheating the thermoplastic foil in the area entirely within the blank forming zone, pressing the foils together causing the foils to adhere together at least temporarily only in those preheated regions within the blank forming zone and from which the blank is to



be formed by stamping, and then stamping the heated sandwich to form the stamped blank.

3,878,019

PROCESS OF PRODUCING SPOT BONDED NON-WOVEN WEBS USING ULTRA-VIOLET RADIATION

Charles Brian Chapman, and Robert Anthony Haldon, both of Abergavenny, England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 142,074, May 10, 1971. This application May 16, 1973, Ser. No. 360,744

Claims priority, application United Kingdom, May 19, 1970, 24212/70

Int. Cl. B29c *19/02;* **B01j** *1/10;* **B32b** *3/02*

U.S. Cl. 156—272 **13 Claims**

1. A process for producing a bonded non-woven flexible web comprising:

a. forming a non-woven web of fibrous material,

b. applying on the web a coating of a film-forming polymer containing a photosensitive group therein or adding thereto a compound containing photosensitive groups,

c. subjecting discrete locations of the film-forming polymer coated web to ultra-violet radiation for a period of time sufficient to cause cross-polymerization of the film-forming polymer at the discrete locations to thereby effect polymer bonding of the web at these locations,

d. removing unpolymerized polymer from the web thereby forming a flexible web having a bending length as measured by a Shirley Stiffness Tester less than a fully bonded web.

3,878,020

METHOD OF MAKING PLYWOOD CORES

James Edward Huffaker, and Brian Douglas Dillon, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 105,397, Jan. 11, 1971, Defensive Publication T 896,014. This application Apr. 16, 1973, Ser. No. 351,225

Int. Cl. B32b *7/14*

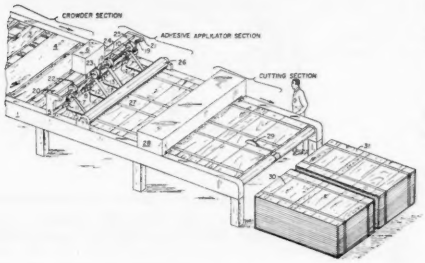
U.S. Cl. 156—291 **5 Claims**

1. Method of continuously making multi-sectional plywood veneer core sheets having substantially uniform dimensions from substantially rectangular sectional sheets having random dimensions comprising the steps of:

a. continuously passing in a forwardly in-line direction a succession of this random width substantially rectangular wood veneer sections of substantially the same length measured perpendicularly to the in-line direction, whereby said sections come into in-line, edge-to-edge contact with onne another, thereby forming a succession of abutting sections,

b. continuously depositing at spaced intervals a plurality of continuous beads of molten hot melt adhesive on the upper surfaces of each of the succession of abutting sections in lines parallel to the in-line direction,

c. pressing a paper tape into contact with each of the adhesive beads, while still soft, whereby the adhesive is spread across the under surface of each tape and into intimate contact with the adjacent wood surfaces of the abutting sections,



d. solidifying the adhesive to form a strong adhesive bond between the tapes and the abutting sections, whereby the sections are firmly held together in-line as a substantially unitary plywood veneer core sheet, and

e. cutting the unitary sheet into a plurality of multi-sectional plywood veneer core sheets having substantially uniform dimensions.

3,878,021

RAPID CURING RESIN COMPOSITIONS COMPRISING A KETONE-ALDEHYDE CONDENSATION POLYMER MODIFIED WITH AN ACYL HYDRAZIDE

George T. Tiedeman, Seattle, Wash., assignor to Weyerhaeuser Company, Tacoma, Wash.

Division of Ser. No. 146,784, May 25, 1971, Pat. No. 3,755,258. This application July 20, 1973, Ser. No. 381,165
Int. Cl. C08g *3/00*
U.S. Cl. 156—331 **50 Claims**

1. An acyl hydrazide-modified condensation polymer comprising the reaction product of a ketone-aldehyde condensation polymer containing reactive alkylol groups with an acyl hydrazide of the formula

$$H_3N_2\overset{O}{\overset{\|}{C}}-(CH_2)_{\underline{a}}-(R)_{\underline{x}}-(CH_2)_{\underline{b}}-R_1$$

wherein *a* and *b* are integers of from 0 to 8 and the sum of *a* and *b* is from 0 to 12; *x* is 0 or 1; R is

$$-CH{=}CH-,\ -\overset{CH_2}{\overset{|}{C}}-,\ -O-,\ -S-,$$

phenylene, biphenylene, naphthylene,

$$-\overset{OH}{\overset{|}{C}}-\underset{CON_2H_3}{} \quad \text{or} \quad -\overset{H}{\overset{|}{C}}-\underset{CON_2H_3}{};$$

and R_1 is

$$-NH_2,\ -N_2H_3 \text{ or } -\overset{O}{\overset{\|}{C}}N_2H_3;$$

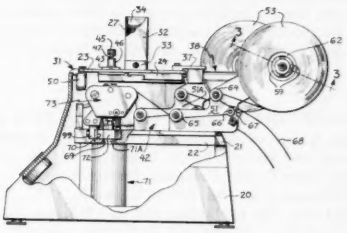
said reaction product being further reactable at ambient temperatures with a curing agent to form an insoluble, infusible product.

3,878,022

APPARATUS FOR PREPARING INVENTORY TICKETS AND LABELS FOR USE BY APPLYING THERETO SECTIONS OF DOUBLE-FACED, PRESSURE-SENSITIVE ADHESIVE TAPE

Robert F. Davis, Framingham, Mass., assignor to Tapeler Corporation, Framingham, Mass.

Continuation-in-part of Ser. No. 192,078, Oct. 26, 1971, abandoned. This application Apr. 10, 1973, Ser. No. 349,824
Int. Cl. B32b *31/00*; **B31b** *19/60*
U.S. Cl. 156—363 **21 Claims**



1. Apparatus for preparing articles to adhere to a surface, said apparatus including structure providing a pathway including first and second stations and dimensioned to slidably receive an article, the first station having an entrance to admit articles one at a time into the pathway, reciprocable means attached to said structure and operable to advance an admitted article to the second station and then return into a position rearwardly of said entrance, at least one surface portion of an article at the second station being exposed, said apparatus also including a support for at least one roll of tape provided on both surfaces with a layer of a double-faced, pressure-sensitive adhesive, and means to draw such tape from a roll on said support and sever and apply a predetermined section thereof to the exposed portion of an article at the second station, said applying means including at least one head reciprocable between a retracted first position and a second position, the second position of the head being below the second pathway station with the severed tape length positioned to contact the undersurface of an article at the second station.

3,878,023

ELECTRICAL BONDING SYSTEM FOR TIRE RECAPPING

Warren L. Dexter, Orinda, Calif., assignor to Electra-Bond, Inc., Livermore, Calif.

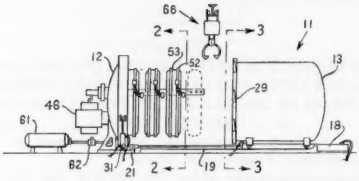
Filed Apr. 18, 1974, Ser. No. 462,105
Int. Cl. B29h *5/04*; **B01j** *3/00*
U.S. Cl. 156—394 **9 Claims**

1. A system for applying heat and pressure to recap tires wherein a tire carcass has layered rubber and heating wires disposed thereabout with new tire tread thereover and gripped thereon by circumferential conducting hoops electrically connected to said heating wires comprising

a shell having first and second separable portions and means for locking said portions together in pressure sealing relation,

a pair of electrically conducting support members mounted in a first shell portion in insulated relation thereto for mounting tires to be recapped,

said support members having connecting means for engagement with electrical connections from tires mounted on said members,



controllable power supply means connected to said support members for energizing the heating wires of tires mounted on said members, and

pressurizing means connected to said shell for pressurizing the interior thereof when said shell portions are connected together to apply a pressure to tires on said support members for vulcanizing new tread to the tires.

3,878,024

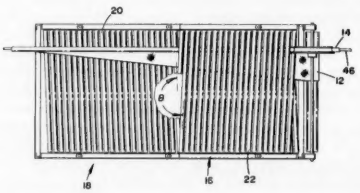
CONTINUOUSLY WRAPPED HOSE MAKING DEVICE

Elmer A. Steckel, Wheatridge; William G. Schaffer, Englewood, and Roger A. Payne, Denver, all of Colo., assignors to The Gates Rubber Company, Denver, Colo.

Division of Ser. No. 220,945, Jan. 26, 1972, Pat. No. 3,813,314. This application Dec. 3, 1973, Ser. No. 420,991

Int. Cl. B31f *1/00*

U.S. Cl. 156—428 **4 Claims**



1. A device for wrapping a flattened strip of reinforcement to tubing comprising:

a first roller assembly including a plurality of cylindrical rollers having their axes aligned substantially parallel with each other and having cylindrical surfaces arranged to substantially contact a first imaginary plane;

a second roller assembly including a plurality of cylindrical rollers having their axes aligned substantially parallel with each other, the axes of the rollers of the second assembly arranged to form a predetermined angle in relationship to the axes of the rollers of the first roller assembly and the rollers of the second assembly having cylindrical roller surfaces arranged to substantially contact a second imaginary plane spaced-apart from and generally parallel to the first plane, the cylindrical rollers of the first and second assemblies adapted to make substantially tangential contact with the tube and wrapped fabric strip; and

means for guiding the strip of reinforcement and tubing generally obliquely to the rollers of the first and second assemblies and along a path where initially the strip is substantially parallel to the tube and where the fabric strip is fed substantially tangentially to the cylindrical roller surfaces of one of the roller assemblies whereby said cylindrical rollers are adapted to lend support to the fabric strip.

3,878,025

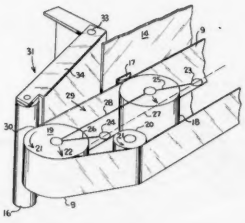
ENVELOPE FLAP SEALING MECHANISM

Anthony Storace, Tarrytown, N.Y., and paul R. Sette, Hamden, Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Apr. 8, 1974, Ser. No. 459,031

Int. Cl. B29h *9/00;* **B31b** *1/00*

U.S. Cl. 156—441.5 **4 Claims**



1. An envelope flap sealing mechanism which prevents the flap of an unsealed letter from being high-sealed to a body portion of the envelope, said flap sealing mechanism comprising:

means defining an envelope feed path for conveying an envelope in substantially vertical orientation past a flap sealing roller;

a belt for transporting the envelope along said feed path with said substantially vertical orientation.

a pair of rotative, spaced-apart guide rollers disposed continuously along said feed path and supporting said belt;

a flap sealing roller disposed adjacent of one of said guide rollers for receiving an unsealed envelope therebetween, and for causing the flap of said envelope to press upon the body of the envelope as the envelope moves past;

means for biasing said flap sealing roller towards sealing engagement with the adjacent guide roller; and

linkage means interconnecting said pair of spaced-apart guide rollers, said linkage means interconnecting said guide rollers such that said pair of guide rollers move in unison, and each of said guide rollers being substantially equally movable with respect to said feed path, said belt supported by the guide rollers consequently being substantially uniformly movable with respect to said feed path, whereby an unsealed envelope being transported by said belt will be properly and uniformly sealed as it moves past said sealing roller.

3,878,026

ELECTRICAL COMPONENT SEQUENCER AND TAPER

Michael D. Snyder, Chenango Bridge, and Frederick G. Tomko, Vestal, both of N.Y., assignors to Universal Instruments Corporation, Binghamton, N.Y.

Filed Aug. 23, 1973, Ser. No. 391,030

Int. Cl. B65b *15/04;* **B65h** *5/26*

U.S. Cl. 156—552 **9 Claims**

1. An apparatus for sequencing electrical components having leads extending from their bodies and taping said leads between ribbons of tape comprising:

a support means;

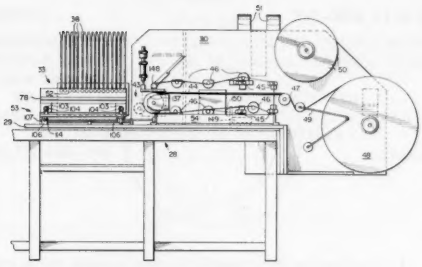
a plurality of supply means attached to said support means for storing a plurality of said electrical components;

taping means attached to said support means for taping said component leads between ribbons of tape;

a plurality of transport means, one for each supply means, each adapted to receive one electronic component from said supply means and transporting said components from said supply means to said taping means; and a transport support means supporting said plurality of transport means for linear movement simultaneously;

first drive means responsive to said transport means for driving said taping means;

a second drive means for moving said transport means from said supply means to said first drive means in a first linear direction; and



a third drive means for moving said transport support means to and from said supply means in a direction orthagonal to said first linear direction.

3,878,027

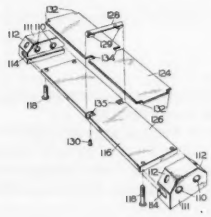
CONTINUOUS, LAMINATED-PLATEN PRESS FOR PRESSING GLUE-COATED PRESS CHARGES

Arthur L. Troutner, Boise, Idaho, assignor to Trus Joist Corporation, Boise, Idaho

Continuation-in-part of Ser. No. 268,674, July 3, 1972, abandoned, Continuation-in-part of Ser. No. 79,839, Oct. 12, 1970, Pat. No. 3,723,230. This application Jan. 4, 1973, Ser. No. 320,874

Int. Cl. B30b *5/06, 15/06*

U.S. Cl. 156—580 **5 Claims**



5. In a continuous press for pressing glue-coated press charges and including a pair of cooperating press belts each comprising a pair of endless support emmbers transversely mounting a plurality of press platens, a laminated press platen comprising:

1. a pair of end blocks having slots in their opposed inner faces,

2. a base plate with its ends received in the slots,

3. a cover plate overlying the working face of the base plate with its ends received in floating condition in the slots,

4. a bar mounted transversely across the central portion of the cover plate and secured releasably to the base plate,

5. releasable securing means securing the blocks to the ends of the base plate, and

6. releasable securing means securing the blocks to their respective endless support members.

3,878,028

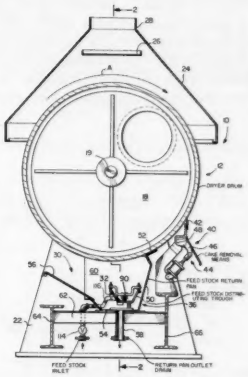
METHOD AND APPARATUS FOR DISTRIBUTING FEED STOCK TO DRYER DRUM

John T. Balch, Birmingham, Ala., assignor to Envirotech Corporation, Menlo Park, Calif.

Filed Aug. 20, 1973, Ser. No. 389,459

Int. Cl. B01d *1/16, 1/22;* **F26b** *3/12*

U.S. Cl. 159—4 SR **4 Claims**



1. A method of distributing a dryable feed stock to a rotating drum surface comprising

a. maintaining a pool of feed stock in spaced relationship below and coextensive with the axial length of a drum to be coated;

b. rotating the drum while

c. releasing pressurized gas at a plurality of longitudinally spaced points below the surface of the pool in a direction generally normal to the drum surface at a pressure effective to entrain a portion of the feed stock and direct it toward and into contact with the rotating drum surface.

3,878,029

COMPACT MULTISTAGE WIPED-FILM EVAPORATOR APPARATUS

James L. Baird, Winchester, and Max Mendelsohn, Randolph, both of Mass., assignors to Artisan Industries Inc., Waltham, Mass.

Filed Nov. 26, 1973, Ser. No. 418,867

Int. Cl. B01d *1/22, 1/26*

U.S. Cl. 159—6 WH **15 Claims**

1. A multistage wiped-film evaporator apparatus which comprises in combination:

a. a vapor chamber having a distillate condensate product outlet;

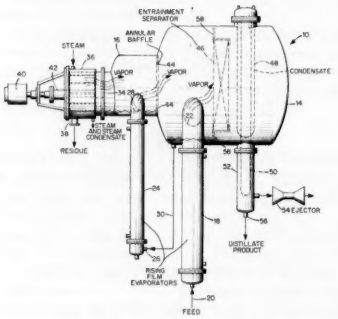
b. a first-stage, vertical thin-film evaporator having an upstream end and a downstream end, wherein a liquid feed stream to be distilled is introduced into the upstream end, and wherein a first vapor stream and a first liquid stream are discharged from the downstream end directly into the interior of the vapor chamber;

c. a second-stage, vertical thin-film evaporator having an upstream end and a downstream end, and wherein at least a portion of the first liquid stream from the interior of the vapor chamber is directed into the upstream end of the second-stage evaporator, and wherein a second vapor stream and a second liquid stream are discharged from the downstream end of the second-stage evaporator directly into the interior of the vapor chamber;

d. means to introduce the first liquid stream in the interior of the vapor chamber to the upstream end of the second-stage evaporator;

e. baffle means within the vapor chamber to prevent the first and second liquid streams discharged from the first and second-stage evaporators from comingling within the vapor chamber, but permitting the comingling of the first and second vapor streams in the vapor chamber;

f. a generally horizontally axised, mechanically aided, thin wiped-film evaporator having a plurality of rotating rotor blades therein within a process shell, the evaporator having a downstream residue discharge outlet and an upstream liquid feed inlet, the liquid feed inlet positioned directly adjacent the vapor chamber, wherein the second liquid stream from the vapor chamber is introduced directly into the upstream liquid feed end of the wiped



thin-film evaporator, wherein the vapor stream from the wiped thin-film evaporator is discharged directly back into the interior of the vapor chamber, and wherein a residue stream is discharged from the outlet of the wiped thin-film evaporator, the vapor stream of the wiped thin-film evaporator and the vapor stream of the first and second stage evaporators comprising a total vapor stream moving counterflow to the direction of the liquid in the vapor chamber and essentially rectilinearly within the vapor chamber;

g. a condensing means within the vapor chamber and at the downstream end thereof with respect to vapor flow to condense at least a portion of the total vapor stream to provide a distillate condensate product at the downstream end of the vapor chamber; and

h. vacuum means to provide a subatmospheric pressure within the multistage evaporator apparatus.

3,878,030

MARBLE LAMINATE STRUCTURE

Grafton H. Cook, P.O. Box 924, Lake Forest, Ill. 60045

Filed May 29, 1973, Ser. No. 364,524

Int. Cl. B32b *3/14*

U.S. Cl. 428—45 **12 Claims**

1. A stone faced laminate structure comprising a thin layer of discrete pieces of stone bonded by a curable bonding material to a surface of a wood fiber underlayment, the layer of stone having a top surface thereon remote from the underlayment, the top surface being smooth and planar and finished in situ after bonding to the underlayment and said stone having a rough bottom surface bonded to the underlayment.

3,878,031

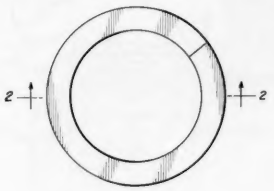
PACKING FOR MOVABLE MACHINE PARTS

Frederic J. Dormer, 315 Central Park West, New York, N.Y. 10025

Filed Oct. 12, 1973, Ser. No. 406,132

Int. Cl. B32b *15/04;* **F16j** *15/00;* **B32b** *27/06, 5/16;* **B65d** *53/04*

U.S. Cl. 428—365 **6 Claims**



1. A packing to be arranged between movable parts, comprising a core which contains an homogenous mixture of polytetrafluoroethylene and at least one element selected from the group consisting of silicone oil, graphite and molybdenum disulfide forming a viscous mass, and a porous coating of fibrous material surrounding said core.

3,878,032

SOUND-REDUCING, COMPOSITE CONVERTING PANEL

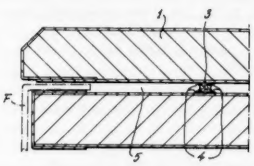
Lars-Inge Bertil Larsson, Bjornbarsgatan 6, Lomma, Sweden

Filed Aug. 25, 1970, Ser. No. 66,801

Claims priority, application Sweden, Sept. 10, 1969, 12470/69

Int. Cl. E04b *2/28;* **E04c** *2/34*

U.S. Cl. 428—101 **8 Claims**



1. A sound reducing, composite covering panel for internal use in buildings comprising:

a. a first planar sheet of gypsum plasterboard,

b. a second planar sheet of gypsum plasterboard,

c. said first and second sheets having substantially the same size and being between about one-half and three-fourths inch thick,

d. said first and second sheets being positioned in a face-to-face spaced apart relationship,

e. a plurality of cord spacer elements interposed between said spaced apart first and second sheets,

f. said cord spacer elements

1. being spaced apart along substantially parallel lines that are between about 3 and 7 inches apart,

2. each having a diameter that is in the order of between about one thirty-second and one-eighth inch,

3. each having a substantially round cross section and being composed of twisted strands that have enough porosity to absorb at least some adhesive,

4. each containing fibrous strands extending obliquely in relation to the longitudinal direction of the cord and substantially filling out the entire cross section thereof,

g. each of said cord spacer elements being secured to each of said sheets of gypsum plasterboard by means of an elastically hardening adhesive composition which forms between each cord spacer element and the plas-

terboard on each side of the spacer element a recessed elastic fillet firmly adhering both to the plasterboard face and to the adjacent portion of the spacer element, whereby each spacer element will form a highly flexible hinge-like connection between the two facing sheets of plasterboard.

3,878,033

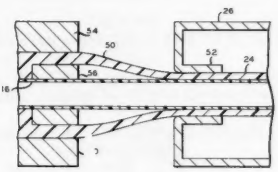
FORMING PARISONS WITH NUCLEATED INNER LAYER

Frederick Zavasnik, Chicago, Ill., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 855,801, Sept. 8, 1969, Pat. No. 3,600,487. This application Mar. 10, 1971, Ser. No. 122,673

Int. Cl. B32b *7/02; B29d 23/04;* **F16l** *11/04*

U.S. Cl. 428—36 **8 Claims**



1. An individual preformed tubular parison comprising an inner tubular layer of polypropylene of 5–50 mils wall thickness, said polypropylene containing 0.005–1 weight percent of a nucleating agent, and an outer integrally joined layer of polypropylene, said outer layer having a thickness of 60–300 mils and said polypropylene comprising said outer layer having no nucleating agent.

3. An article according to claim **1** wherein said inner layer of polypropylene has a relatively high melt flow and said outer layer has a relatively low melt flow.

3,878,034

REFRACTORY LAMINATE BASED ON NEGATIVE SOL OR SILICATE AND POSITIVE SOL

James N. Bever; Earl P. Moore, Jr., and Robert L. Rusher, all of Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 148,956, Aug. 12, 1971, Pat. No. 3,751,276, which is a continuation-in-part of Ser. No. 49,916, June 25, 1970, abandoned. This application Mar. 7, 1973, Ser. No. 338,689

Int. Cl. B22c *9/00*

U.S. Cl. 428—35 **12 Claims**

1. A refractory laminate comprising alternate layers of (1) a gel of at least one member of the group consisting of negatively charged colloidal silica particles and a quaternary ammonium, sodium, potassium or lithium silicate and (2) a gel of positively charged colloidal particles selected from the group consisting of silica and alumina particles.

3,878,035

METHOD OF PREPARING POLYAMIDE REINFORCED POLYESTER RESINS

Gerard E. Van Gils, Tallmadge, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio

Filed July 23, 1973, Ser. No. 381,907

Int. Cl. B32b *27/08, 27/36, 27/38*

U.S. Cl. 260—835 **8 Claims**

1. A method for preparing a polyester resin article reinforced with polyamide elements which comprises wetting said elements with a liquid consisting essentially of a dispersion or suspension of a minor amount of an epoxide having an average of from about 2 to 4 epoxide groups per molecule and having a molecular weight up to about 600, heat curing said wetted elements to produce dried polyepoxide treated elements, introducing said dried polyepoxide treated elements into an uncured liquid unsaturated polyester resin, shaping the resulting composite as desired and curing it.

2. The product produced by the method of claim **1.**

3,878,036

SAFETY GLASS PREPARED BY CURING A B-STAGE POLYURETHANE SHEET

Wen-Hsuan Chang, Gibsonia, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 35,286, May 6, 1970, abandoned, which is a continuation-in-part of Ser. No. 746,739, July 23, 1968, abandoned. This application Sept. 8, 1972, Ser. No. 287,386

Int. Cl. B32b *27/40*

U.S. Cl. 428—424 **16 Claims**

1. An impact resistant, clear safety glass laminate formed by the steps of

1. placing one or more sheets of glass in adherent contact with a solid sheet of essentially linear B-stage polyurethane corresponding to the average formula:

$$\left(X - \overset{O}{\overset{\|}{C}} - NHR_1 - NHC - O \right)_m Y(OR)_{n-m}$$

where X is a radical containing a polymerizable terminal acrylyl or alpha-acrylyl group and corresponding to a hydroxyl-containing ester containing at least one hydroxyl group and a terminal acrylyl or alpha-substituted acrylyl group with a hydroxyl hydrogen atom removed.

R_1 is the divalent organic radical corresponding to an organic diisocyanate selected from the group consisting of hydrocarbon diisocyanates, substituted hydrocarbon diisocyanates and isocyanato-terminated adducts of a polyether polyol with two isocyanato groups removed,

Y is the radical corresponding to a polyol of N-hydroxyl groups with the hydroxyl groups removed,

R is hydrogen or an organic group containing urethane linkages,

n is a number greater than 1 and up to 8, and

m is a number greater than 1 and up to 4; wherein said B-stage polyurethane, while being curable to a hard thermoset state by addition polymerization is essentially thermoplastic; and

2. curing said B-stage polyurethane with the aid of a free radical initiator while in adherent contact with said glass by addition polymerization through said acrylyl or alpha-substituted acrylyl group.

3,878,037

METHOD OF ENHANCING THE HYPOCHLORITE BLEACHING OF PULP

Gerald D. Hansen, Holicong; Elizabeth G. Varney, Levittown, and Philip S. Davis, Furlong, all of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

Filed June 29, 1973, Ser. No. 374,839

Int. Cl. D21c *3/04, 3/18*

U.S. Cl. 162—73 **6 Claims**

1. A method of enhancing the hypochlorite bleaching of pulp which comprises adding to the bleaching medium, a water soluble polyacrylic acid homopolymer or its water soluble salt, said homopolymer having a molecular weight of from about 500 to 20,000 and contacting said medium with an aqueous slurry of the pulp to be bleached, said homopolymer being added to the bleaching medium in an amount of from 0.5 to 100 parts per million parts of aqueous slurry pulp.

3,878,038

STIFF LIGHT-WEIGHT PAPER

Fritz Opderbeck, Meerbusch-Buderich; Volker Franzen, Dusseldorf-Golzheim, and Guido Dessauer, Dusseldorf-Gerresheim, all of Germany, assignors to Feldmuhle Anlagen-nind produktionsgesellschaft mit beschrankter Haftung, Dusseldorf, Germany

Filed Mar. 16, 1972, Ser. No. 235,412

Claims priority, application Germany, Mar. 18, 1971, 2113216

Int. Cl. D21h *3/52*

U.S. Cl. 162—167 **7 Claims**

1. A stack of sheets of laminar structure, each sheet consisting essentially of cellulose fibers and a condensation product of water-soluble polyvinyl alcohol and a water-soluble precondensate of formaldehyde with melamine or urea, the weight ratio of said polyvinyl alcohol to said precondensate in said condensation product being between 1:1 and 9:1, said sheet having a weight of 35 to 70 grams per square meter, a core layer of said sheet consisting essentially of said cellulose fibers and not more than 12 percent by weight of said condensation product, and the sheet having at least one surface layer consisting essentially of said condensation product in an amount of 1.5 to 3.0 grams per square meter of said surface layer and being bound to said core layer by cellulose fibers extending from said core layer into said surface layer, the mechanical strength, stiffness, and bulk density of said surface layer being substantially greater than the corresponding properties of said core layer, the molecular weight of said polyvinyl alcohol being at least 2000, each sheet being directly and releasably superimposed on said surface layer of another sheet.

3,878,039

PAPER MACHINE HEADBOX HAVING CONVERGENT THROAT PORTION

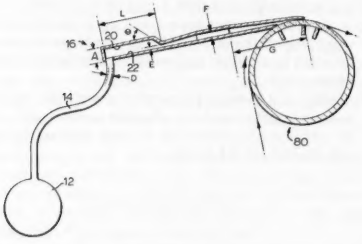
John Gilbert Descary, Lachine, and Ramamurthy Gopal Krishnan, Montreal, both of Quebec, Canada, assignors to Dominion Engineering Works, Limited, Quebec, Canada

Filed May 21, 1973, Ser. No. 362,082

Claims priority, application Canada, June 20, 1972, 145134

Int. Cl. D21f *1/06*

U.S. Cl. 162—336 **6 Claims**



1. In a headbox for supplying a stock suspension to a machine slice of a web forming machine at substantially uniform velocity profile, a distributor section having an elongated tapered header extending in a cross machine direction to receive stock from a stock supply, a mixing chamber of substantially uniform shallow depth A throughout the length thereof, extending across the machine and connected to the header by a plurality of substantially uniformly spaced flow connection pipes of small diameter directly entering one face of the mixing chamber adjacent the chamber back wall to provide in operation a zone of sudden flow expansion with succeeding impingement of stock against the opposing chamber face spaced said distance A therefrom, with consequent increase in macro turbulence, said mixing chamber faces converging to a throat portion of depth E spaced a distance L from the chamber back wall and diverging in a downstream direction at an angle of divergence of not more than 7° to provide diffusion of the suspension, the ratio of mixing chamber length to depth, L/A, being equal to or greater than 6 and the ratio of mixing chamber depth to throat depth, A/E, being greater than 3.

3,878,040

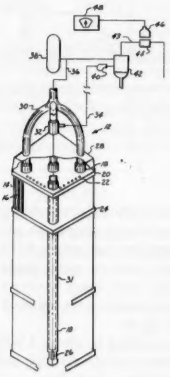
FAILED FUEL DETECTOR

John Anthony Martucci, Charleroi, Pa., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Sept. 20, 1973, Ser. No. 399,038

Int. Cl. G21c *17/04*

U.S. Cl. 176—19 LD **4 Claims**



1. A failed fuel detection apparatus for a nuclear reactor having a liquid cooled core composed of vertically disposed fuel assemblies, said fuel assemblies consisting of a spaced array of clad, vertically disposed, fuel elements with coolant channels therebetween and said fuel assemblies additionally having longitudinal passages therethrough for the insertion and removal of neutron absorption elements, said failed fuel detection means comprising:

a. means adapted to engage the top of one of said fuel assemblies for collecting gas exiting from the top of said fuel assembly; and

b. means mounted on said gas collection means for delivering gas to the vicinity of the bottom of said fuel assembly, said gas being capable of entraining gaseous fission products contained in said liquid coolant.

3,878,041

OXYNITRIDE FUEL KERNEL FOR GAS-COOLED REACTOR FUEL PARTICLES

James M. Leitnaker, Kingston, and Terrence B. Lindemer, Oak Ridge, both of Tenn., assignors to The United States of America as represented by the Administrator of the Energy Research and Development Administration, Washington, D.C.

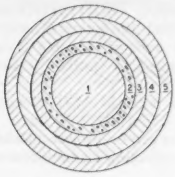
Filed Aug. 8, 1973, Ser. No. 386,657

Int. Cl. G21c *3/06;* **C21c** *3/20*

U.S. Cl. 176—67 **6 Claims**

1. A high temperature gas-cooled reactor fuel particle comprising a spheroidal kernel of a metal oxide and a metal nitride

with up to 33-⅓ mole percent nitride, said oxide and nitride being selected from the group consisting of a mixture of UO_2



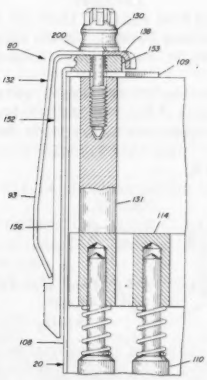
and U_2N_3, a mixture of $(U,Pu)O_2$ and U_2N_3, a mixture of ThO_2 and Th_2N_3, and a carbon cover adjacent said kernel.

3,878,042

SPRING AND STOP ASSEMBLY FOR NUCLEAR FUEL BUNDLE

Michael V. Curulla; Bart A. Smith, and John A. Ashton, all of San Jose, Calif., assignors to General Electric Company, San Jose, Calif.

Filed Sept. 12, 1973, Ser. No. 396,491
Int. Cl. G21c *3/32*
U.S. Cl. 176—78 **5 Claims**



1. A fuel bundle comprising a plurality of nuclear fuel elements maintained in an array by means including an upper tie plate; an upwardly extending extension of said tie plate at an upper corner of said fuel bundle, said extension having a threaded hole in its upper end; a removable elongated tubular flow channel surrounding said array of fuel elements; a corner member fixed to said channel and overlying said extension and formed with a clearance hole aligned with the hole in said extension; a stop member including a top section overlying said corner member and formed with a threaded hole aligned with the hole in said corner member; a spring member including a top section overlying said top section of said stop member and formed with a hole aligned with said threaded hole in said top section of said stop member; a bolt having a threaded portion at one end, a head of larger diameter than said threaded portion at the other end of said bolt, and a smooth shank portion of smaller diameter than said threaded portion between said threaded portion and said head, said bolt being threaded through said holes in said spring, stop and corner members and into said threaded hole in said extension whereby said spring member, said stop member and said flow channel are secured to said fuel bundle, the adjacent end threads of said threaded end portion of said bolt and in said threaded hole of said top section of said stop member being mutually deformed and upset whereby said spring member and said stop member are captured on said shank portion of said bolt.

3,878,043

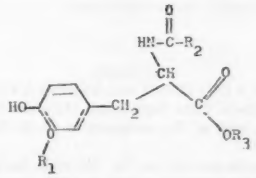
METHOD FOR PREPARING L-DOPA AND NOVELS COMPOUNDS USEFUL THEREIN

Michael S. Matta, Edwardsville; Joe A. Kelley, Collinsville, both of Ill., and Michael F. Rohde, Columbus, Ohio, assignors to Southern Illinois University Foundation, Carbondale, Ill.

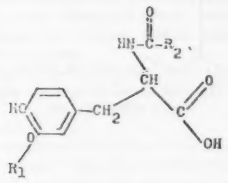
Filed Jan. 2, 1973, Ser. No. 320,108
Int. Cl. C12d *1/00*
U.S. Cl. 195—29 **21 Claims**

1. A method of preparing an intermediate which is readily convertible to L-dopa comprising the steps of:

preparing a resolution system comprising a mixture of optical isomers of a precursor compound and a proteolytic enzyme in an aqueous medium, said precursor compound corresponding to the structural formula:



wherein R_1 is selected from the group consisting of hydrogen, methyl and ethyl, R_2 is selected from the group consisting of hydrogen, alkyl, aryl, furyl, thienyl, styryl, t-butyloxy and benzyloxy, and R_3 is selected from the group consisting of methyl, ethyl, n-propyl and isopropyl; hydrolyzing the L-isomer of said precursor compound to produce the L-isomer of a substituted N-acyl alanine intermediate corresponding to the structural formula:



while leaving the D-isomer of said precursor compound substantially unchanged; and

isolating said intermediate from the unchanged D-isomer of the precursor.

3,878,044

METHOD OF PRODUCING L-ARGININE BY FERMENTATION

Koji Kubota, Kawasaki; Takiko Onoda, Tokyo; Hirotaka Kamijo, Kawasaki, and Shinji Okumura, Tokyo, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Oct. 1, 1973, Ser. No. 402,020
Claims priority, application Japan, Oct. 9, 1972, 47-101488
Int. Cl. C12d *13/06*
U.S. Cl. 195—29 **2 Claims**

1. A method of producing L-arginine which comprises:

a. culturing *Brevibacterium flavun* FERM-P 1639 in an aqueous medium containing assimilable sources of carbon and nitrogen, inorganic salts, and minor organic

nutrients necessary for the growth of said *Brevibacterium flavum* until arginine accumulates in said medium; and

b. recovering the accumulated arginine.

3,878,045

PROCESS FOR THE PRODUCTION OF HETEROPOLYSACCHARIDE BY FERMENTATION OF METHANOL

Alex L. Tannahill, and Robert K. Finn, both of Ithaca, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Filed June 12, 1973, Ser. No. 369,403

Int. Cl. C12d *1/00*

U.S. Cl. 195—49 **12 Claims**

1. In a method of producing a heteropolysaccharide by a fermentation process of culturing a micro-organism of *Methylomonas mucosa* NRRL B5696 on a culture medium containing methanol as the sole source of assimilable carbon, the improvement which comprises initiating fermentation on said culture medium with a methanol content of between about 0.5 and 2% by volume, conducting said fermentation until the optical density of the fermentation broth reaches a value of at least 1.0 and adding an additional amount of methanol within the range of about 1 to 4% by volume.

3,878,046

HYDROXYLATED PROSTAGLANDINS AND PROCESS

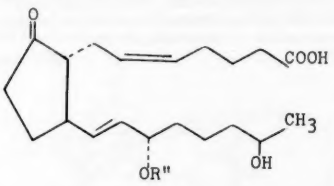
William Marsheck, Lake Zurich, and Masateru Miyano, Morton Grove, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

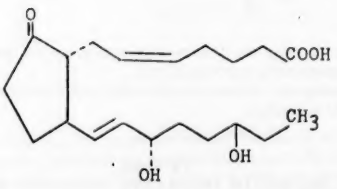
Continuation-in-part of Ser. No. 352,662, April 19, 1973, abandoned. This application Sept. 4, 1973, Ser. No. 393,775

Int. Cl. C12b *1/00*

U.S. Cl. 195—51 R **3 Claims**

1. In a process for producing a compound of the formula





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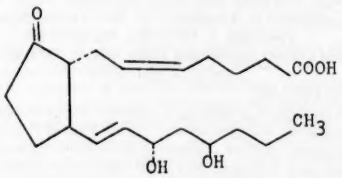

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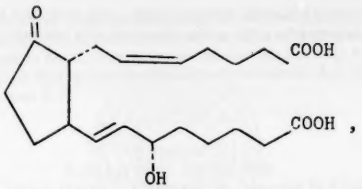
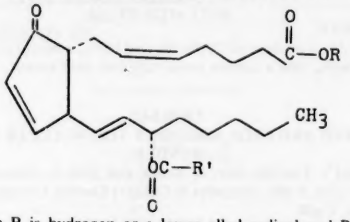
or



wherein R'' is hydrogen or a lower alkanoyl radical, the step which comprises subjecting a compound of the formula



wherein R is hydrogen or a lower alkyl radical and R' is a lower alkyl radical, in a nutrient medium, to the fermentative action of a bacterium of the Streptomyces genus.

3,878,047

PROCESS FOR PRODUCTION OF AT-125

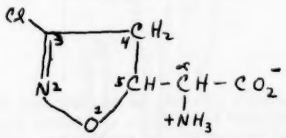
Ladislav J. Hanka, and David G. Martin, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 329,001, Feb. 2, 1973, which is a continuation-in-part of Ser. No. 234,347, March 13, 1972, abandoned. This application Sept. 6, 1974, Ser. No. 503,633

Int. Cl. C12d *9/00*

U.S. Cl. 195—80 R **6 Claims**

1. A process for making antibiotic AT-125



which comprises cultivating *Streptomyces sviceus* in an aqueous nutrient medium under aerobic conditions until substantial antibiotic activity is imparted to said medium by the production of antibiotic AT-125.

3,878,048

DETERMINATION OF GAMMA-GLUTAMYL TRANSPEPTIDASE IN BIOLOGICAL FLUIDS AND DIAGNOSTIC REAGENTS USED THEREFOR

James J. Carroll, East Hanover, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 282,632, Aug. 21, 1972, Pat. No. 3,769,173. This application June 11, 1973, Ser. No. 369,046

Int. Cl. G01n *31/14*

U.S. Cl. 195—99 **4 Claims**

1. A diagnostic dye-coupling composition for the determination of gamma-glutamyl transpeptidase concentrations in biological fluids comprising an aqueous mineral acid solution containing:

A. from about 11.8 to about 29.5 micromoles of 8-hydroxy quinoline sulfate per milliliter of biological fluid; and

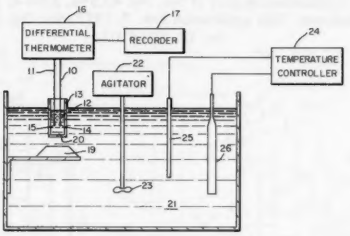
B. from about 1% to about 5% by volume, based on the total volume of the mineral acid solution, of a water soluble nonionic emulsifier;

said mineral acid solution being adjusted to a pH of from about 0.8 to about 1.3.

3,878,049
BIOCHEMICAL TEMPERATURE-SENSITIVE PROBE AND METHOD FOR MEASURING REACTANT CONCENTRATIONS THEREOF

Steven R. Tannenbaum, Framingham; James C. Weaver, Wayland, and Charles L. Cooney, Brighton, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Apr. 3, 1973, Ser. No. 347,574
Int. Cl. C12k *1/04*
U.S. Cl. 195—103.5 R **11 Claims**



1. An apparatus for measuring the concentration of a substrate in a fluid which comprises a reference thermal probe, a second thermal probe coated with a microorganism or an enzyme, said probes being formed of a material which exhibits a change in a measurable electrical property as a function of temperature, and means for measuring the difference in said measurable electrical property of said probes.

3,878,050
MULTI-DIFFERENTIAL AGAR CULTURE MEDIUM

Sun Yong Lee, Arvada, Colo., assignor to Adolph Coors Company, Golden, Colo.

Filed Apr. 1, 1974, Ser. No. 456,984
Int. Cl. C12k *1/10*
U.S. Cl. 195—100 **6 Claims**

1. A multi-differential agar culture medium which has the capability to differentiate between a large variety of closely related bacterial species, comprising tomato juice, peptonized milk, yeast extract, glucose, calcium pantothenate, a pH lowering agent, a non-diffusible buffering agent, metals and minerals, a wetting agent and stimulator of growth of lactic acid bacteria, an acid-base color indicator, a yeast suppressing agent, and agar.

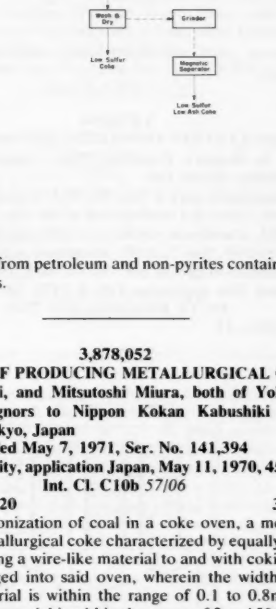
3,878,051
DESULFURIZING COKE WITH PHOSGENE OR A MIXTURE OF CARBON MONOXIDE AND CHLORINE

Raymond H. Long, Post House Rd., Mail Rt. 18, Morristown, N.J. 07960, and Morgan C. Sze, 18 Skytop Ter., Upper Montclair, N.J. 07043

Continuation-in-part of Ser. No. 309,470, Nov. 24, 1972, abandoned. This application Aug. 31, 1973, Ser. No. 393,576
Int. Cl. C10b *57/06*
U.S. Cl. 201—17 **17 Claims**

1. A process for desulfurizing coke, comprising:

contacting the coke with a desulfurizing gas comprising a member selected from the group consisting of phosgene and a mixture of carbon monoxide and chlorine, said contacting being effected at a coke temperature from 1200°F. to 1800°F. for a time sufficient to produce a coke with a sulfur content of no greater than 0.85%, said coke being admixed with a ferruginous material comprising a member selected from the group consisting of oxides of iron, iron and mixtures thereof for desulfurizing a coke



prepared from petroleum and non-pyrites containing coal feedstocks.

3,878,052
METHOD OF PRODUCING METALLURGICAL COKE

Yasuo Hayashi, and Mitsutoshi Miura, both of Yokohama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Chiyeda, Tokyo, Japan

Filed May 7, 1971, Ser. No. 141,394
Claims priority, application Japan, May 11, 1970, 45-39247
Int. Cl. C10b *57/06*
U.S. Cl. 201—20 **3 Claims**

1. In a carbonization of coal in a coke oven, a method of producing metallurgical coke characterized by equally distributing and mixing a wire-like material to and with coking coals which is charged into said oven, wherein the width of said wire-like material is within the range of 0.1 to 0.8mm, and length of said material is within the range of 2 to 150mm, and the adding amount of said material is within the range of 0.01 to 0.5% by weight.

3,878,053
REFRACTORY SHAPES AND JAMB STRUCTURE OF COKE OVEN BATTERY HEATING WALL

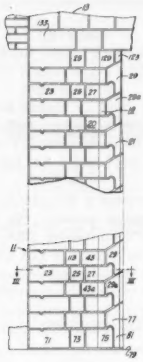
Jack Hyde, Pittsburgh, Pa., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed Sept. 4, 1973, Ser. No. 394,301
Int. Cl. C10b *1/00, 1/06, 29/00*
U.S. Cl. 202—223 **15 Claims**

1. In a coke oven battery having heating walls with vertical flues therein, a jamb structure at the ends of each heating wall comprised of horizontal courses of refractory brick shapes comprising:

a. a plurality of vertically arranged adjacent interdigitating

refractory jamb shapes with each shape having top and bottom parallel planar sloping surfaces coacting with



adjacent jamb and intermediary end wall refractory shapes.

3,878,054

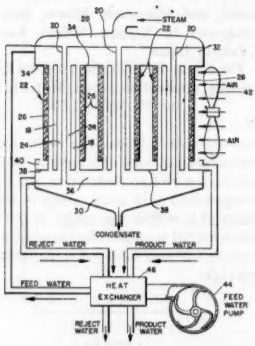
DISTILLATION APPARATUS AND PROCESS

Franklin A. Rodgers, Brookline, Mass., assignor to Pactide Corporation, Dover, Del.

Continuation-in-part of Ser. No. 80,570, Oct. 14, 1970, abandoned, which is a continuation of Ser. No. 524,366, Dec. 27, 1965, abandoned, which is a continuation of Ser. No. 456,040, May 7, 1965, abandoned, which is a continuation-in-part of Ser. No. 417,039, Dec. 9, 1964, abandoned. This application Feb. 8, 1973, Ser. No. 330,749

Int. Cl. B01d *3/00, 3/10, 3/06*

U.S. Cl. 203—11 **25 Claims**



1. In a distillation method comprising the steps of introducing bodies of a liquid at different concentrations of matter other than said liquid into contact with opposite sides of a microporous membrane substantially non-wettable by said liquid and transferring heat to the higher concentration liquid body in contact with one side of said membrane while transferring heat from the lower concentration liquid body in contact with the other side of said membrane to maintain said higher concentration liquid body at a vapor pressure higher than the vapor pressure of said lower concentration liquid body to cause the vapor of said higher concentration liquid body to pass through the pores of said membrane to said lower concentration body of liquid where said vapor is condensed, the improvement comprising:

removing substantially all gases except the vapor of said liquid from at least said higher concentration body of liquid prior to contacting said membrane with said body of liquid.

3,878,055

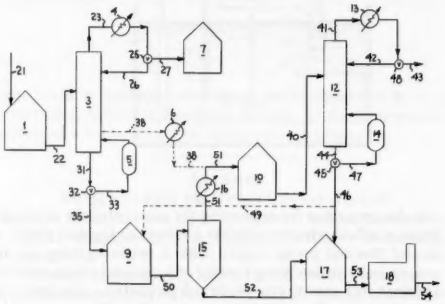
RECLAMATION OF SPENT GLYCOL BY DISTILLATION IN THE PRESENCE OF A CATALYTIC AMOUNT OF ALKALI METAL HYDROXIDE

Jerry W. Cox, and Mulkey Carl Wilkes, both of Beaumont, Tex., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 43,596, June 4, 1970, abandoned. This application Feb. 7, 1972, Ser. No. 224,259

Int. Cl. E01d *3/34*

U.S. Cl. 203—37 **21 Claims**



1. A method for recovering ethylene glycol from spent glycol containing at least 0.1 weight percent dimethyl terephthalate comprising, in combination, the steps of:

a. treating the spent glycol at at least 30°C. with a catalytic amount of alkali metal hydroxide, said catalytic amount being between about 0.01 and about 5 weight percent based on the spent glycol;

b. flash evaporating the thus treated spent glycol in an evaporator under conditions such that little or no accumulation of liquid occurs in the evaporator; and

c. introducing overhead product from the evaporator into a distillation zone and removing a substantially dry, pruified ethylene glycol product stream from near the bottom of said zone.

3,878,056

PROCESS FOR ELECTROLYTIC COLORING OF THE ANODIC OXIDE FILM ON A ALUMINUM OR ALUMINUM BASE ALLOYS

Kiyomi Yanagida; Tadashi Hirokane; Tadashi Tsukiyasu, and Tomoari Sato, all of Nagoya, Japan, assignors to Sumitomo Chemical Co., Ltd., Osaka, Japan

Filed Aug. 26, 1974, Ser. No. 500,761

Claims priority, application Japan, Aug. 24, 1973, 48-95500

Int. Cl. C23f *5/00, 17/00;* **C23b** *9/02*

U.S. Cl. 204—35 N **11 Claims**

1. A process for electrolytically coloring an anodic oxide coating on aluminum or an aluminum alloy article by subjecting the article having an anodized oxide film of a thickness of at least about 6 microns to a direct current electrolysis in an aqueous electrolytic coloring bath containing a water-soluble metal salt, which comprises applying first to the anodized article a cathodic electrolysis wherein the aluminum article is subjected to a direct current electrolysis as the cathode for at least a few seconds and then applying alternatingly at least once to the article an anodic electrolysis wherein the article as the anode is subjected to a direct current electrolysis and a cathodic electrolysis wherein the article as the cathode is subjected to a direct current electrolysis.

3,878,057

PLURAL STAGE DISTILLATION OF A CRUDE 3-METHYLMERCAPTOPROPIONALDEHYDE FEED IN SOLUTION WITH A VOLATILE WEAK ACID AND A LESS VOLATILE STRONG ACID

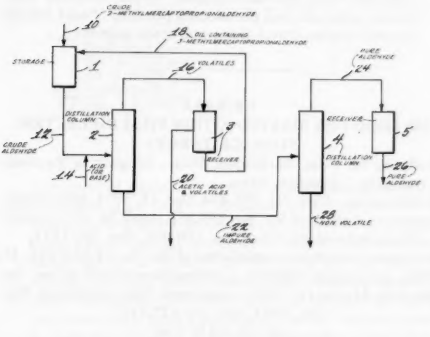
Sven-Peter Mannsfeld, Bruhl, Germany, assignor to Deutsche Gold-und Silber-Scheideanstalt vormals Roessler, Frankfurt am Main, Germany

Filed Nov. 20, 1972, Ser. No. 307,826

Claims priority, application Germany, Nov. 26, 1971, 2158616

Int. Cl. B01d 3/34

U.S. Cl. 203—35 9 Claims



1. In a process of recovery of pure 3-methylmercaptopropionaldehyde from a base containing crude product by a two step distillation in the presence of an acid the improvement comprising carrying out the distillation steps in the presence of a mixture of a difficultly volatile strong acid selected from the group consisting of sulfuric acid, phosphoric acid and aryl sulfonic acid and an easily volatile weak acid selected from the group consisting of formic acid, acetic acid and propionic acid, said difficultly volatile strong acid having a boiling point higher than 3-methylmercaptopropionaldehyde and said easily volatile weak acid having a boiling point lower than 3-methylmercaptopropionaldehyde, distilling off the volatile impurities and said easily volatile weak acid as overheads in the first distillation step, leaving a bottoms containing 3-methylmercaptopropionaldehyde and said difficultly volatile strong acid, and distilling the 3-methylmercaptopropionaldehyde as overheads in the second distillation step leaving a bottoms containing said difficultly volatile strong acid.

3,878,058

RECOVERY OF ALKYLVINYLETHER BY EXTRACTIVE DISTILLATION OF A FEED CONTAINING ONLY TRACE AMOUNTS OF WATER

Kazuaki Tanaka; Yasuto Ishida; Mamoru Sato; Hidetaka Kishimoto, and Kimiyoshi Yanagi, all of Yokkaichi, Japan, assignors to Kyowa Yuka Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 1, 1973, Ser. No. 328,804

Claims priority, application Japan, Feb. 5, 1972, 47-12569

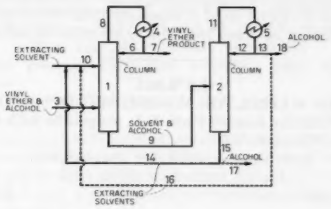
Int. Cl. B01d 3/34

U.S. Cl. 203—63 9 Claims

1. A process for recovering alkylvinylether from a mixture of alkylvinylether and aliphatic alcohol which comprises adding in the absence of other than trace amounts of water as an extracting solvent at least one monoalkylether substituent of glycol of the general formula:

$$R(OCH_2CH_2)_nOH$$

wherein R represents an alkyl group and n represents an



integer of from 1 to 3, and subjecting the resultant mixture to distillation conditions to separate said alkylvinylether.

3,878,059

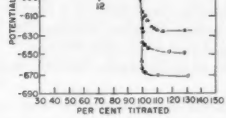
METHOD OF CHELOMETRIC TITRATION OF METAL CATIONS USING TUNGSTEN BRONZE ELECTRODE

Margaret A. Wechter, Westport Point, Mass., and Paul B. Hahn, Malvern, Pa., assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed May 28, 1974, Ser. No. 473,325

Int. Cl. G01n 27/46

U.S. Cl. 204—1 T 8 Claims



1. In a method of chelometric titration of a known volume of solution containing an unknown concentration of a metal ion, the steps comprising: contacting the solution with an indicating electrode comprising a tungsten bronze crystal of the formula A_xWO_3 wherein A is an alkali metal and x is greater than 0 and less than 1; contacting said solution with a reference electrode; adding a chelating agent of known concentration in measured volume to said solution to complex said metal ion, said chelating agent being a polycarboxylate derivative of an organic amine and said indicating electrode being responsive to the presence of said chelating agent; and measuring the voltage between said electrodes, an abrupt and substantial change in said voltage being representative of the equivalence point of said titration.

3,878,060

PROCESS FOR THE ELECTROLYTIC REDUCTION OF FISSIONABLE ELEMENTS

Reinhard Kroebel, Leopoldshafen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 23, 1972, Ser. No. 283,248

Claims priority, application Germany, Sept. 16, 1971, 2146262

Int. Cl. C01g 56/00

U.S. Cl. 204—1.5 12 Claims

1. In a process for reducing salt solutions containing uranyl nitrate in an electrolysis cell having a catholyte stabilizer and anodes of metals from the platinum group, or anodes coated with metals from the platinum group, the improvement which comprises carrying out said process in an enclosed electrolysis zone defined by a liquid-tight sealed tubular graphite cathode containing a maximum of 80 ppm of vanadium and an inner

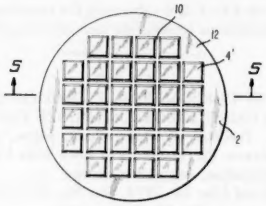
concentric anode, said zone having compartments between the cathode and anode separated by an annular concentric diaphragm for containing the catholyte and anolyte, said catholyte having a composition of from 1 to 4 mol/l of nitric acid, from 0.5 to 1.5 mol/l of uranium; from 0.05 to 0.5 mol/l of hydrofluoric acid and from 0.1 to 0.5 mol/l of stabilizer.

3,878,061

MASTER MATRIX FOR MAKING MULTIPLE COPIES

Nathan Feldstein, Kendall Park, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Feb. 26, 1974, Ser. No. 445,970
Int. Cl. C23b *7/00;* **B01k** *1/00*
U.S. Cl. 204—11 **9 Claims**



1. A master matrix for making multiple copies of an article by electroplating metal in the grooves of a groove-patterned base substrate and stripping the formed article therefrom, comprising:

a substrate consisting essentially of a degenerately doped silicon body having a highly polished flat surface, said surface having a thin oxide film thereon,

an adherent layer of an inorganic dielectric material on said surface, and

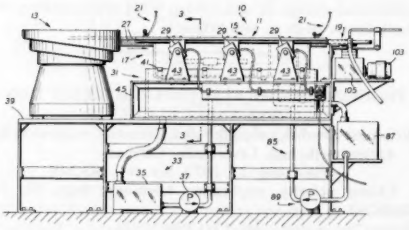
a pattern of grooves in said dielectric layer such that said polished silicon oxide surface is exposed at the bottoms of said grooves.

3,878,062

ELECTROPLATING APPARATUS AND METHOD

Guy M. Grimaldi, North Warren; Thomas E. Byler, Pittsfield, and Charles D. Seekings, Youngsville, all of Pa., assignors to GTE Sylvania Incorporated, Seneca Falls, N.Y.

Filed June 28, 1973, Ser. No. 374,535
Int. Cl. C23b *5/48;* **B23p** *1/02;* **C23b** *5/76*
U.S. Cl. 204—15 **14 Claims**



1. An apparatus for electroplating preselected portions of individual articles, said apparatus comprising:

a track member adapted for having each of said articles travel therealong;

supply means for supplying said articles to said track member;

vibratory means engaged to said track member for effecting movement of said articles along said track member;

a container adapted for containing a predetermined quantity of electrolyte solution therein, said container positioned substantially below and related to said track member;

means for controlling the elevation of said electrolyte solution within said container whereby said solution contacts said preselected portions of said articles which protrude beneath the track member as said articles travel along said track member;

means for controlling the rate of travel of said articles along said track member;

first electrode means associated with said articles as said articles travel along said track member; and

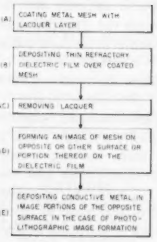
second electrode means of opposite polarity than said first electrode means and associated with said electrolyte solution, said second electrode means spacedly positioned adjacent said preselected portions of said articles as said articles travel along said track member.

3,878,063

METHOD FOR MAKING A THIN FILM DIELECTRIC STORAGE TARGET

Wolfgang M. Feist, Burlington, Mass., assignor to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 208,494, Dec. 15, 1971, abandoned, which is a division of Ser. No. 355,855, April 30, 1973, which is a continuation of Ser. No. 210,095, Dec. 20, 1971, abandoned, which is a continuation of Ser. No. 12,566, Feb. 19, 1970, abandoned, which is a continuation-in-part of Ser. No. 806,534, March 12, 1969, abandoned. This application Dec. 26, 1973, Ser. No. 427,742
Int. Cl. C23b *5/48*
U.S. Cl. 204—15 **4 Claims**


(A) COATING METAL MESH WITH LACQUER LAYER
(B) DEPOSITING THIN REFRACTORY DIELECTRIC FILM OVER COATED MESH
(C) REMOVING LACQUER
(D) FORMING AN IMAGE OF MESH ON OPPOSITE OR OTHER SURFACE OR PORTION THEREOF ON THE DIELECTRIC FILM
(E) DEPOSITING CONDUCTIVE METAL IN IMAGE PORTIONS OF THE OPPOSITE SURFACE IN THE CASE OF PHOTOLITHOGRAPHIC IMAGE FORMATION

1. A method for fabricating a dielectric storage target comprising the steps of:

coating a non-reactive electrically conductive metal wire mesh with a nitrocellulose layer;

depositing a thin boron nitride film on at least portions of said nitrocellulose layer;

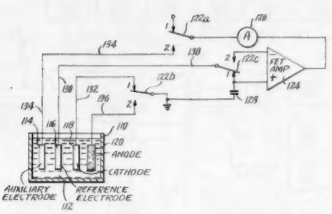
heating the coated mesh to remove the nitrocellulose layer and to bond said boron nitride film to said mesh; and

forming a pattern of conductive metal on portions of the surface of the boron nitride film opposite to portions of said metal comprising exposing a photo-sensitive layer deposited on said film to a pattern of light passing through the apertures in said mesh and through portions of said boron nitride film.

3,878,064
METHOD AND APPARATUS FOR MEASURING PITTING CORROSION TENDENCIES

Aaron Weisstuch, Yardley, and Charles E. Schell, III, Feasterville, both of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

Filed July 27, 1973, Ser. No. 383,212
Int. Cl. G01n *27/46*
U.S. Cl. 204—1 T **13 Claims**



1. A method of measuring the pitting corrosion tendency of metal exposed to an electrolytic liquid, comprising:

a. placing a first and a second electrode in the electrolytic liquid wherein access to oxygen is unrestricted, said electrodes having an open circuit potential therebetween,

b. storing the open circuit potential on a storage means,

c. disconnecting the first electrode from the storage means and connecting a third electrode to which oxygen access is restricted thereto, said third electrode being in the liquid and the only electrode to which oxygen access is restricted,

d. placing a fourth electrode in the liquid,

e. connecting the fourth electrode in a circuit including the second electrode upon disconnecting of the first electrode and connecting of the third electrode to the storage means,

f. causing the potential of a circuit including the third electrode, the fourth electrode and the storage means to equal the potential initially stored on the storage means, and

g. measuring the current required to cause the potential of the circuit including the third electrode to equal the potential of the circuit including the first electrode whereby the pitting corrosion tendency is ascertained.

3,878,065
PROCESS FOR FORMING SOLDERABLE COATING ON ALLOYS

John M. Carr, River Falls, Wis., and Pat F. Mentone, St. Paul, Minn., assignors to Buckbee-Mears Company, St. Paul, Minn.

Filed Jan. 30, 1974, Ser. No. 437,944
Int. Cl. C23b *5/50, 1/00;* **B23p** *3/00*
U.S. Cl. 204—40 **7 Claims**

1. The process of applying an electroplating base to an alloy article comprising the steps of:

cleaning the article to remove organic and inorganic materials;

electroplating a copper strike to the alloy article;

removing the article with the copper strike thereon while maintaining the alloy article in a wetted condition followed by electroplating a silver strike to the alloy article by applying an electroplating voltage to the alloy article and then inserting the alloy article into a copper-silver electroplating solution to thereby produce an electroplating base for applying a solderable coating.

3,878,066
BATH FOR GALVANIC DEPOSITION OF GOLD AND GOLD ALLOYS

Manfred Dettke, Angersburgallee, 1 Berlin 19; Karl-Hans Fuchs, Holderlinstrasse 11, 7015 Korntal, and Rolf Ludwig, Neve Kantstrasse 21/22, 1 Berlin 19, all of Germany

Filed Aug. 29, 1973, Ser. No. 394,959
Claims priority, application Germany, Sept. 6, 1972, 2244434
Int. Cl. C23b *5/28, 5/42, 5/46*
U.S. Cl. 204—43 G **5 Claims**

1. An aqueous bath for the electrodeposition of gold or gold alloys having a high gloss, said bath having a pH of from about 5 to 10 and an amount of components, A, B and C to provide a coating having high gloss and extraordinary adhesion, said bath comprising

A. from about 0.005 to 50 grams per liter of at least one compound of the general formula RCHO wherein R is selected from the group consisting of hydrogen, methyl, and the group - CHO, and an aldehyde bisulfite addition compound thereof, and

B. from about 0.1 to 50 grams per liter of at least one compound of the general formula $R_2N-(R'-NR)_m-(R')_n-NR$ in which each R is selected from the group consisting of hydrogen, alkyl having from 1 to 5 carbon atoms and hydroxy-substituted alkyl having from 1 to 5 carbon atoms, m and n is 0 or an integer from 1 to 3, and

C. from about 0.001 to 5 grams per liter of at least one alkali metal salt of a member of the group consisting of arsenic acid and arsenious acid, and

D. a water soluble gold compound in an amount of about 1 to 50 grams per liter.

5. A bath according to claim **1** for electrodeposition of gold alloy containing at least one alloy metal selected from the group consisting of silver, copper, zinc, cadmium, cobalt, nickel, palladium, indium, manganese, antimony and tin wherein the alloy-metals are added to the bath in the form of water-soluble compounds in amounts of about 0.01 to 200 grams per liter.

3,878,067
ELECTROLYTE AND METHOD FOR ELECTRODEPOSITING OF BRIGHT NICKEL-IRON ALLOY DEPOSITS

Robert Arnold Tremmel, Woodhaven, Mich., assignor to Oxy Metal Finishing Corporation, Warren, Mich.

Continuation-in-part of Ser. No. 268,352, July 3, 1972, abandoned. This application Nov. 8, 1973, Ser. No. 414,003
Int. Cl. C23b *5/32, 5/46*
U.S. Cl. 204—43 T **40 Claims**

1. An aqueous bath suitable for the electrodeposition of a bright iron-nickel electrodeposit onto a substrate susceptible to corrosion comprising not less than about 10 grams per liter nickel plus ferric and ferrous ions, the ratio of nickel ions to ferric and ferrous ions being from about 5 to about 50 to 1, 0.5 to 10 g/l of a bath soluble organic primary nickel brightener of the first class containing a sulfo-oxygen group, an amount of a bath soluble complexing agent effective to keep substantially all of the ferric and ferrous ions in solution and containing at least two complexing groups, said groups being independently selected from the group consisting of carboxy and hydroxy, provided at least one group is a carboxy group; the bath having a pH from about 2.5 and about 5.5 and 0.5 to 40 mg/l of an organic sulfide of the formula:

$$R_1 - N = C(R_2) - S - R_3$$

wherein R_1 is hydrogen or a carbon atom of an organic radical; R_2 is nitrogen or a carbon atom of an organic radical and R_3 is a carbon atom of an organic radical.

3,878,068

METHOD FOR ELECTROPLATING GOLD AND ELECTROPLATING BATHS THEREFOR

Maurice Bick, South Orange, and Jean A. Lochet, Metuchen, both of N.J., assignors to Auric Corporation, Newark, N.J.

Continuation-in-part of Ser. Nos. 273,860, July 21, 1972, Pat. No. 3,770,596, and Ser. No. 288,020, Sept. 11, 1972, Pat. No. 3,783,111. This application July 12, 1973, Ser. No. 378,703The portion of the term of this patent subsequent to Dec. 26, 1989, has been disclaimed.

Int. Cl. C23b *5/28, 5/42, 5/46*

U.S. Cl. 204—46 G **13 Claims**

1. An electroplating bath for plating gold, comprising:

an aqueous solution of an alkali-gold cyanide; said gold being present in the range of from about 2 to 36 g/l, calculated as the metal;

from 0.5 to 60 g/l of a chelating agent selected from the group consisting of trans-1, 2-diaminocyclohexane tetra acetic acid, ethylenediamine tetra methylenephosphonic acid, and the bath soluble salts of said acids;

from 0.5 to 15 ml/l of hydrazine or a bath soluble salt thereof, calculated as 64 percent hydrazine;

as an agent for improving the distribution and aesthetic qualities of the deposit, between from about 0.4 to 12 mg/l of trivalent arsenic ion, calculated as the metal; and as additional conductivity and buffering compounds, one or more alkali phosphates, said compounds being present in concentrations appropriate in the presence of the remaining bath components to adjust the bath specific gravity to a desired level of from about 8° to 20° Baume, said level being above that which would be achieved in the absence of said compounds.

3,878,069

ACID ZINC GALVANIC BATH

Hans-Günther Todt, Chlodwigstrasse 5, 1 Berlin 42, and Günter Voss, Rosenanger 30, 1 Berlin 28, both of Germany

Continuation-in-part of Ser. No. 162,272, July 13, 1971, abandoned. This application May 31, 1973, Ser. No. 365,760

Claims priority, application Germany, Aug. 15, 1970, 2041397

Int. Cl. C23b *5/12, 5/46*

U.S. Cl. 204—55 R **3 Claims**

1. An aqueous acid galvanic zinc electroplating bath containing (a) a water-soluble zinc salt in a concentration between about 30 and about 200 g per liter expressed as zinc chloride, (b) a water-soluble ammonium salt in a concentration sufficient to improve the bath conductivity but insufficient to interfere with subsequent zinc ion removal by dilution and alkaline precipitation, (c) a water-soluble condensation product of formaldehyde and at least two naphthalene sulfonic acids linked by methylene bridges and which contain from 1 to 3 sulfonic acid groups in an amount effective to impart ductility and malleability to the zinc coating produced from said bath, and (d) a luster former selected from the group consisting of polymeric organic glycols and glycol ethers, and organic carbonyl compounds in an amount effective to impart luster to the zinc coating produced from said bath, said bath containing no complexing agent for zinc and being capable upon dilution with water in a ratio of about 500:1 and neutralization with alkali of precipitating the zinc ion present to such an extent such that not more than about 3 mg per liter of zinc ion is retained in said bath.

3,878,070

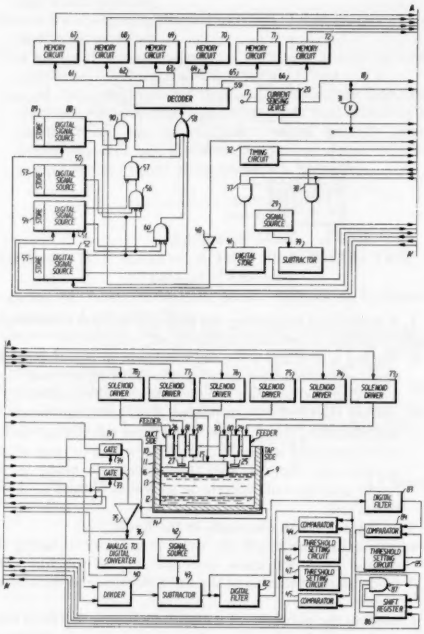
APPARATUS FOR AND METHOD OF PRODUCING METAL

Joseph A. Murphy, Murraysville, Pa., assignor to Southwire Company and National Steel Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 298,405, Oct. 18, 1972. This application Feb. 21, 1973, Ser. No. 334,233

Int. Cl. C22d *3/00, 3/02, 3/12*

U.S. Cl. 204—64 R **24 Claims**



1. A mehtod of producing metal comprising providing an electrolytic bath containing dissolved oxide of the metal in a reduction cell, causing direct current to flow through said bath, collecting said metal on the bottom of said reduction cell, electrically sensing the process generated noise component of resistance of said bath and electrically determining when such component exceeds a given level as an indication of an undesirable noise level.

3,878,071

COPPER EXTRACTION

John Harold Selby, 21 Zaymel Gardens, Duchess Ave., Windsor Park, Randburg, Transvaal, and George Stephen James, 5 13th Ave., Parktown North, Johannesburg, Transvaal, both of South Africa

Filed July 17, 1973, Ser. No. 379,968

Claims priority, application South Africa, July 18, 1972, 72/4933

Int. Cl. C01b *17/00, 17/96;* **C01g** *3/00*

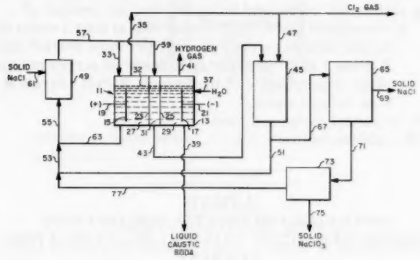
U.S. Cl. 204—92 **19 Claims**

1. A process of precipitating Chevreul salt from a solution comprising copper dissolved in sulfurous acid including the steps of contacting the solution in an electrolytic cell with a pair of electrodes and applying a potential difference across the electrodes which is such that the cathode potential with respect to a standard saturated calomel electrode is in the range from a few millivolts to about 250 millivolts to cause precipitation of the Chevreul salt.

3,878,072
ELECTROLYTIC METHOD FOR THE MANUFACTURE OF CHLORATES

Edward H. Cook, Jr., Lewiston, and Alvin T. Emery, Youngstown, both of N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Nov. 1, 1973, Ser. No. 411,612
Int. Cl. C01b *11/26*; **C01d** *1/06*; **B01k** *3/12*
U.S. Cl. 204—95 **9 Claims**



1. In a process for electrolyzing an aqueous alkali metal chloride solution in an electrolytic cell having at least three compartments therein, an anode, a cathode, at least one permselective membrane of a hydrolyzed copolymer of a perfluorinated hydrocarbon and a fluosulfonated perfluorovinyl ether, or a sulfostyrenated perfluorinated ethylene propylene polymer, the cathode-sidewall of the buffer compartment between the anode and cathode and the anode-sidewall of said compartment being defined by such permselective membrane or a porous diaphragm, such walls, with walls thereabout defining an anode and cathode compartment, the improvement which comprises introducing an aqueous solution containing chloride and chlorate into the anode compartment of such cell, introducing water into the buffer and cathode compartments, passing electric current between the anode and cathode of said cell, forming hydroxide ions in both said buffer compartment and said cathode compartments and chlorine in said anode compartment, reacting gaseous chlorine with the contents of said buffer compartment and/or the solutions removed therefrom, the conditions of such reaction being controlled to produce hypochlorite or chlorate and chloride, converting the hypochlorite, when produced, to chlorate and chloride, feeding at least a portion of the chlorate and chloride thus produced to the anode compartment for electrolysis of chloride therein to chlorine, with a resulting increase in the proportion of chlorate to chloride in the anolyte, and recovering chlorine, chlorate and substantially chloride free hydroxide as the electrolysis products.

3,878,073
OXYGEN EXCHANGE WITH LIQUID METALS

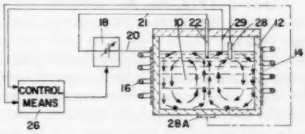
William M. Boorstein, Columbus; Lawrence M. Friedman, Westerville; Robert A. Rapp, Columbus, all of Ohio, and Karl E. Oberg, Stockholm, Sweden, assignors to The Ohio State University Research Foundation, Columbus, Ohio

Filed July 14, 1972, Ser. No. 271,786
Int. Cl. C23b *1/00*; **C01b** *13/04*
U.S. Cl. 204—140 **11 Claims**

1. An apparatus for the exchange of oxygen with a liquid metal, the apparatus comprising:

a. a solid electrolyte cell formed by a solid, oxygen ion conducting electrolyte wall having a first surface in contact with said liquid metal and its opposite surface exposed to an oxygen transporting phase and having an oxygen transmitting electrode on said opposite surface, said liquid metal operating as the other electrode of said cell;

b. electromagnetic induction means for turbulently stirring said liquid metal past said electrolyte; and



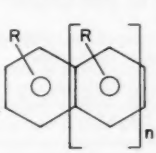
c. a DC power supply connected to said cell electrodes for applying a pumping voltage to said cell.

3,878,074
VINYLATION OF AROMATIC COMPOUNDS

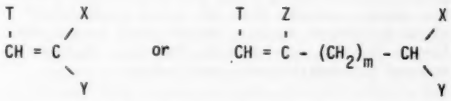
Paul H. Reichenbacher, Elk Grove Village, and Theresa M. Forsythe, Mount Prospect, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed July 26, 1973, Ser. No. 382,781
Int. Cl. B01j *1/10*
U.S. Cl. 204—158 R **13 Claims**

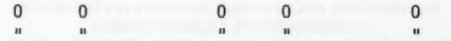
1. A process for the photocatalytic vinylation of an aromatic compound possessing the generic formula:



in which R is selected from the group consisting of hydrogen, hydroxyl, alkyl, alkoxyl, aryl, alkaryl, aralkyl, cycloalkyl and halogen radicals and *n* is an integer of from 0 to 2, which comprises reacting said aromatic compound with an ethylenic compound possessing the formula:



in which T, X, Y and Z are selected independently from the group consisting of hydrogen, alkyl,



and OR' radicals, R' being selected from the group consisting of hydrogen, alkyl, aryl, cycloalkyl, aralkyl and alkaryl radicals, and *m* is an integer of from 0 to 16 in the presence of an organic salt of a metal of Group VIII, an organic salt of a transition metal and an oxygen-containing gas at reaction conditions, said mixture being exposed to the emission from a light source having a wave length of less than 4,000A.

3,878,075

PHOTOPOLYMERIZATION OF PIGMENTED BINDERS USING COMBINATIONS OF ORGANIC CARBONYLS AND HALOGENATED NAPHTHALENES

Vincent Daniel McGinniss, Middleburgh Heights, Ohio, assignor to SCM Corporation, Cleveland, Ohio

Division of Ser. No. 346,350, March 30, 1973. This application July 3, 1974, Ser. No. 485,594

Int. Cl. C08f *1/20, 1/56*

U.S. Cl. 204—159.23 4 Claims

1. In a photopolymerization process for ultraviolet curing of a film comprising a pigmented binder system of 1 weight part of an ethylenically unsaturated binder combined with about 0.05 to 2 weight parts of opacifying pigment, and exposing said film to an energy source containing UV energy having wavelengths between about 1600 A and 4000 A until said film is cured, the improvement which comprises:

providing a film of said pigmented binder system containing by weight about 0.5% to 3% halogenated derivative of naphthalene having at least one halogen attached to the alphaatom attached to the naphthalene ring, 0.1% to 2% of an aromatic phenyl ketone, and at least 0.5% of an aromatic photosensitizer selected from the group consisting of aromatic aldehydes and aromatic ketones different than said atomatic phenyl ketone.

3,878,076

PHOTOCURABLE COMPOSITION AND A METHOD OF PREPARING SAME

Tadatomi Nishikubo; Masahiko Kishida, and Masakazu Imaura, all of Fujisawa, Japan, assignors to Nippon Oil Seal Industry Co., Ltd., Kanagawa-ken, Japan

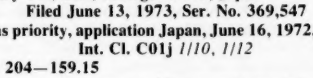
Filed June 13, 1973, Ser. No. 369,547

Claims priority, application Japan, June 16, 1972, 47-59461

Int. Cl. C01j *1/10, 1/12*

U.S. Cl. 204—159.15 5 Claims

1. A photocurable composition comprising (a) a polyester having a repeating unit of the formula:



wherein R is an acid residue of a polycarboxylic acid selected from the group consisting of succinic acid, phthalic acid, chlorendic acid, trimellitic acid, pyromellitic acid, nadic acid, methyl nadic acid, tetrahydrophthalic acid, hexahydrophthalic acid and tetrachlorophthalic acid, and R′ is a carbonyloxy group selected from the group consisting of acryloyloxy group, methacryloyloxy group, crotonoyloxy group and cinnamoyloxy group, and (b) a photopolymerization initiator selected from the group consisting of 2-alkylanthraquinone, benzoin, benzoin ester, benzoin ether, benzoin thioether, decyl chloride, benzoin — Michler's ketone and N,N-dialkylaniline — alkyl halide.

3,878,077

RADIATION CURABLE COMPOSITIONS OF ACRYLATED EPOXIDIZED SOYBEAN OIL AMINE COMPOUNDS USEFUL AS INKS AND COATINGS AND METHODS OF CURING SAME

George W. Borden, Charleston; Oliver W. Smith, South Charleston, and David J. Trecker, Charleston, all of W. Va., assignors to Union Carbide Corporation, New York, N.Y.

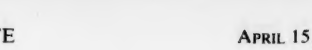
Division of Ser. No. 103,912, Jan. 4, 1971, abandoned. This application Mar. 22, 1973, Ser. No. 343,692

Int. Cl. B01j *1/10;* C08d *1/00*

U.S. Cl. 204—159.16 24 Claims

1. A composition comprising:

I. an acrylated epoxidized soybean oil amine compound having in the molecule the group:



wherein X is hydrogen or methyl and R′ taken singly is alkyl of 1 to 15 carbon atoms or aryl having up to 15 carbon atoms and the two R′ groups taken together with the nitrogen atom attached thereto form a heterocyclic ring having from 5 to 6 ring atoms, said compound being the reaction product of:

A. epoxidized soybean oil reacted with at least 2 moles of acrylic acid or methacrylic acid per mole thereof and B. from 5 to 40 mole per cent, based on acrylyl groups of an organic amine of the formula R'_2NH wherein R′ is as defined above;

II. an acrylyl compound; and

III. a photosensitizer.

3,878,078

APPARATUS AND PROCESS FOR APPLYING ELECTRODEPOSITION PAINTING BY ALTERNATING CURRENT

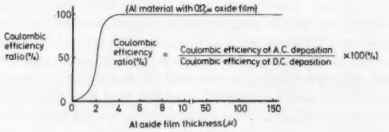
Tadashi Tanaka, Ranishi-machi; Tatsuro Obi, Tokyo, and Yoshio Shindow, Kawasaki-shi, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Sept. 12, 1972, Ser. No. 288,400

Claims priority, application Japan, Sept. 14, 1971, 46-71331

Int. Cl. B01k *5/00;* C23b *13/00*

U.S. Cl. 204—181 23 Claims


(Al material with Al2O3 oxide film)
100
50
0
Coulombic efficiency ratio(%)
Coulombic efficiency ratio(%) = Coulombic efficiency of A.C. deposition / Coulombic efficiency of D.C. deposition ×100(%)
0 2 4 6 8 10 50 100 150
Al oxide film thickness(μ)

1. A process for applying electrodeposition paint coating by alternating current comprising applying paint coating to a metallic material with an alternating current voltage in a resin bath using an electrode having an oxide film and forming said film thicker than 0.2 μ.

3,878,079

METHOD OF PRODUCING THIN TANTALUM FILMS

Alois Schauer, Gruenwald, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Mar. 23, 1973, Ser. No. 344,194

Claims priority, application Germany, Mar. 28, 1972, 2215151The portion of the term of this patent subsequent to Apr. 30, 1991, has been disclaimed.

Int. Cl. C23c *15/00*

U.S. Cl. 204—192 5 Claims

1. A method of producing thin-film tantalum in the α-phase body-centered cubic lattice with a cathode sputtering apparatus including a sputtering chamber containing a sputtering atmosphere and a tantalum target member, comprising:

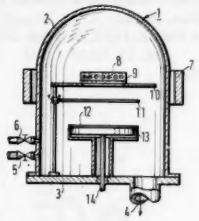
heating a glass glazed or ceramic substrate positioned within the chamber so as to have a surface thereof exposed to the target member to a temperature above 300°C,

adjusting the sputtering atmosphere so that it contains a given amount of a sputtering gas and a much smaller amount of a reactive gas,

applying a high frequency discharge to the target member

so that sputtering occurs, and

depositing relatively pure tantalum in α-phase body-



centered cubic lattice on the exposed surface of said substrate.

3,878,080

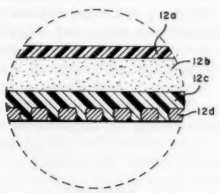
CARBON MONOXIDE SENSOR

James R. Luck, Burnsville, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Sept. 9, 1974, Ser. No. 504,012

Int. Cl. G01n *27/46*

U.S. Cl. 204—195 P **3 Claims**



1. In an electrochemical cell adapted to be used in determining the concentration of carbon monoxide in a fluid medium comprising:

a cell chamber having an opening across at least a portion of one surface thereof;

a reference electrode disposed within said chamber in gas-tight isolation from the environment external to said chamber other than by said opening;

an electrolyte solution in said chamber in communication with said reference electrode and said opening;

a measuring electrode also disposed within said chamber in gas-tight isolation from the environment external to said chamber other than by said opening and in communication with said electrolyte; and,

electrical leads attached to each of said electrodes;

the improvement comprising;

a gas permeable composite membrane member in generally sheet form disposed in liquid-tight relation with and closing said opening in said chamber, said composite membrane member comprising three layers;

an outer layer including an oxygen and carbon monoxide-permeable, non-conducting membrane member in generally sheet form;

a central oxygen transport layer comprising a quantity of a stable hemeprotein compound, which at normal ambient temperatures is capable of reversibly binding molecular oxygen but which preferentially binds carbon monoxide contained in a medium impermeable to oxygen other than by said hemeprotein;

an inner oxygen-permeable member in generally sheet form in liquid-tight engagement with said inner portion of cell.

3,878,081

ALUMINUM SACRIFICIAL ANODE

John T. Reding, and Robert L. Riley, Jr., both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed July 15, 1974, Ser. No. 488,334

Int. Cl. C23f *13/00*

U.S. Cl. 204—197 **23 Claims**

1. An extruded sacrificial aluminum anode consisting essentially of about 0.02 to about 2 weight per cent bismuth, about 0.005 to about 0.05 weight per cent gallium, about 0.005 to about 0.5 weight per cent indium and the balance being essentially aluminum.

3,878,082

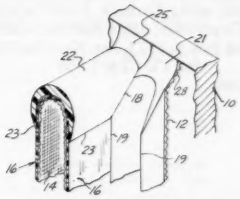
DIAPHRAGM CELL INCLUDING MEANS FOR RETAINING A PREFORMED SHEET DIAPHRAGM AGAINST THE CATHODE

Sudarshan D. Gokhale, Trenton, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Feb. 19, 1974, Ser. No. 443,614

Int. Cl. B01k *3/10*

U.S. Cl. 204—226 **10 Claims**



1. In a diaphragm-type electrolytic cell for the production of chlorine from an aqueous alkali metal chloride solution and having therein cathodes wherein the conventional asbestos-type diaphragm has been replaced by a preformed sheet diaphragm the improvement comprising in combination:

1. an expansible elasto-polymeric crescent-shaped retainer for retaining said diaphragm in place at the junction of the vertical cathode wall and the vertical inner cathode ring wall on each side of the cathode, and

2. compressible elasto-polymeric U-shaped retainers for retaining said diaphragm in place at least at the junction of the curved top and bottom portions of the cathode and the inner cathode ring wall, one said U-shaped retainer being attached to the top of said cathode and another said U-shaped retainer being attached to the bottom of said cathode, said crescent-shaped retainers and said U-shaped retainers in cooperation maintaining said preformed sheet diaphragm in place and preventing the flow of electrolyte around the end of said diaphragm from one electrolyte chamber to the other electrolyte chamber in said cell.

3,878,083

ANODE FOR OXYGEN EVOLUTION

Oronzio De Nora; Giuseppe Bianchi; Antonio Nidola, and Giovanni Trisoglio, all of Milan, Italy, assignors to Electronor Corporation, Panama City

Filed May 17, 1973, Ser. No. 361,022

Claims priority, application Italy, May 18, 1972, 24526/72

Int. Cl. B01k *3/06*; **C22d** *1/00*

U.S. Cl. 204—290 F **10 Claims**

1. An electrode comprising an electroconductive base provided with a coating over at least a portion of its outer surface of a mixed material of tantalum oxide and iridium oxide, in

which the ratio of tantalum to iridium calculated as metal is 1:1 to 0.34 to 1.

3,878,084

BIPOLAR ELECTRODE

Robert F. Schultz, Niagara Falls, and Edward H. Cook, Jr., Lewiston, both of N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed May 25, 1973, Ser. No. 363,927
Int. Cl. B01k *3/04*
U.S. Cl. 204—290 F **10 Claims**

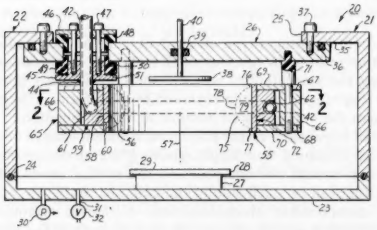
1. A bipolar electrode consisting of a core of a valve metal, at least a portion of the anodic surface of which is conductively covered by at least one anodic material selected from platinum group metals and platinum group metal oxides, and a barrier layer of germanium on the cathodic side of the valve metal core, at least a portion of the exterior surface of the layer of germanium being covered by at least one cathodic material selected from iron, copper, cobalt, nickel and alloys of these.

3,878,085

CATHODE SPUTTERING APPARATUS

John F. Corbani, Santa Barbara, Calif., assignor to Sloan Technology Corporation, Santa Barbara, Calif.

Filed July 5, 1973, Ser. No. 376,322
Int. Cl. C23c *15/00*
U.S. Cl. 204—298 **37 Claims**



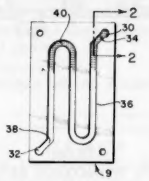
1. Cathode sputtering apparatus for operation within an evacuable enclosure, for coating a substrate which is also contained within said enclosure, said apparatus comprising: a cathode having a face of material to be sputtered; magnetic means adjacent to the cathode and at a side thereof opposite from the face, said magnetic means including a pair of magentic poles, at least one of which is elongated, and between which there are developed magnetic lines of force, at least some of said lines of force entering and leaving said face at spaced-apart intersections therewith, and including continuously arched segments extending between said intersections which are spaced from the face, said face together with said lines of force forming a boundary of a closed area in the plane of each of the respective lines of force, a tunnel-like path within which charged particles tend to be retained, and along which they tend to move; an anode in proximity to the cathode; and connector means whereby said cathode and said anode can be connected to a source of electrical potential.

3,878,086

ELECTRODIALYSIS STACK AND SPACER FOR USE THEREIN

David B. Haswell, Fitchburg, and John L. Eisenmann, Hingham, both of Mass., assignors to Process Research, Incorporated, Cambridge, Mass.

Filed May 1, 1972, Ser. No. 249,690
Int. Cl. B01d *13/02*
U.S. Cl. 204—301 **19 Claims**



1. A flow-directing spacer for use between the cationic and anionic membranes of electrodialysis apparatus comprising a relatively thick inner ply of a relatively low modulus polymer sandwiched between two outer and relatively thin plies of relatively high modulus polymer, wherein the bonds between the outer and inner plies are formed of a pressure sensitive adhesive, and wherein a turbulence promoting means is placed within a flow path defined by an aperture in said spacer, the aperture being the depth of the three said plies

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3,878,087

METHOD FOR PRODUCING RESINOUS PITCH

Yoshio Kawai; Tadashi Araki, both of Tokyo; Kazuhiro Watanabe, Kawaguchi; Ryoichi Takahashi; Kazuo Noguchi, both of Tokyo; Nobuo Hatazawa, Sendai, and Nobuo Hatazawa, Tokyo, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 165,333, July 22, 1971, abandoned, which is a continuation-in-part of Ser. No. 813,330, April 3, 1969, abandoned. This application May 16, 1973, Ser. No. 360,906
Claims priority, application Japan, Apr. 4, 1968, 43-21948; Apr. 20, 1948, 43-26350; Apr. 20, 1968, 43-26351
Int. Cl. C10c *1/04;* **C10g** *9/00*
U.S. Cl. 208—40 **2 Claims**

1. A process for producing a resinous pitch composition which consists essentially of:

a. subjecting naphtha to thermal cracking for acetylene production at a temperature of from 1,100° to 1,500°C. under normal pressure with a heat medium selected from the group consisting of combustion flame and high temperature steam for a contact time of from 0.001 to 0.1 second to produce a tarry substance:

b. further subjecting said tarry substance to distillation under pressure ranging from normal pressure to 10kg/cm²(atm.) at a temperature of from 250° to 450°C. to remove light oil fractions including volatile matter therefrom; and

c. grinding the heat-treated product into powder form having a particle size range of from 4 to 200 meshes,

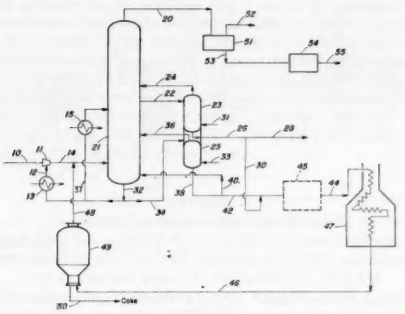
said ground product being characterized by a softening point of from 150° to 400°C., a benzene-insoluble component of from 50 to 90% by weight, and a specific gravity of from 1.2 to 1.5.

3,878,088

INTEGRATED PRODUCTION OF OLEFINS AND COKE

Robert S. Nahas, 6 Horizon Rd., Fort Lee, N.J. 07024, and Andre Armand Simone, 2 Windfield Dr., Parsippany, N.J. 07054

Filed Mar. 4, 1974, Ser. No. 447,664
Int. Cl. C10g 37/02
U.S. Cl. 208—50 8 Claims



1. A process for production of olefins and coke from a hydrocarbon feedstock comprising:
a. cracking the hydrocarbon in the presence of steam to produce a gaseous effluent;
b. quenching the gaseous effluent by contacting it with a hydrocarbon quench fluid;
c. introducing coke drum vapors into the quenched gaseous effluent from step (b);
d. separating the product of (c) into (i) an overhead fraction comprising gasoline and lighter hydrocarbons, (ii) a middle fraction having a boiling range of about 360° F to about 600° F, and (iii) a bottoms fraction having a boiling range of above about 600° F;
e. recycling a portion of the bottoms fraction of (d) to serve as the hydrocarbon quench fluid in step (b);
f. recovering olefins from the overhead fraction of (d);
g. subjecting another portion of the bottoms fraction of (d) to a delayed coking operation, including coke drums; and
h. introducing overhead vapors from the coke drums into step (c).

3,878,089

HYDROCARBON CONVERSION WITH A MULTIMETALLIC CATALYTIC COMPOSITE

Frederick C. Wilhelm, Arlington Heights, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 233,819, March 10, 1972, Pat. No. 3,798,155. This application Feb. 19, 1974, Ser. No. 443,899
Int. Cl. C10g 35/08, 13/10; C07c 5/30
U.S. Cl. 208—139 13 Claims

1. A process for converting a hydrocarbon charge stock which comprises contacting the hydrocarbon charge stock, at hydrocarbon conversion conditions, with a catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % iridium, about 0.1 to about 3.5 wt. % halogen and bismuth in an amount sufficient to result in an atomic ratio of bismuth to platinum or palladium of about 0.1:1 to about 1:1, wherein the platinum or palladium, iridium and bismuth are uniformly dispersed throughout the porous carrier material and wherein substantially all of the platinum or palladium, iridium and bismuth are present in the corresponding elemental metallic states.

3,878,090

DENSE SOLVENT DEMULSIFICATION METHOD FOR BITUMINOUS PETROLEUM-WATER EMULSIONS

David Arthur Redford, Fort Saskatchewan, Calif., assignor to Texaco Exploration Canada Ltd., Calgary, Alberta, Calif.

Filed Sept. 27, 1973, Ser. No. 401,528
Int. Cl. C10g 33/04
U.S. Cl. 208—188 9 Claims

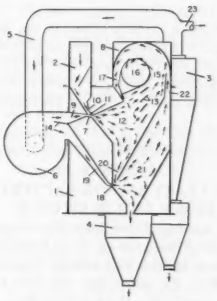
1. A process for resolving an emulsion of water and bituminous petroleum, the specific gravity of the bituminous petroleum being essentially the same as the specific gravity of water, comprising,
contacting said emulsion with a treating material which is soluble in the bituminous petroleum and essentially insoluble in water, the treating material being selected from the group consisting of carbon disulfide, carbon tetrachloride, chlorinated methane, chlorinated ethane and mixtures thereof, wherein the volume ratio of treating material to emulsion is from about .01 to about 10.0.

3,878,091

METHOD FOR PNEUMATIC CLASSIFICATION AND A PNEUMATIC CLASSIFIER

Risto Tapani Hukki, Otaniemi, Finland, assignor to Kennedy Van Saun Corporation, Danville, Pa.

Filed Sept. 15, 1972, Ser. No. 289,270
Claims priority, application Finland, Sept. 28, 1971, 2683/71
Int. Cl. B07b 9/02
U.S. Cl. 209—12 7 Claims

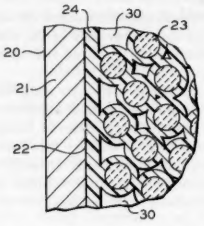


1. A method of pneumatically classifying finely divided solid materials comprising the steps of:
a. delivering the material to be classified into an air stream to form a suspension ejecting the resulting suspension into a primary dispersion space wherein coarse material settles out by gravity,
b. passing the air suspension with the finer material into a centrifugal classifying field wherein a final fine product is recovered in the air stream and a coarser middling product is separated therefrom,
c. passing the settled coarse material from the primary dispersion space into an air stream to form a suspension, ejecting the resulting suspension into a secondary dispersion space wherein a final coarse product settles out by gravity from the air suspension containing middling material, and
d. passing the resulting air suspension into the centrifugal field and mingling it with the air suspension from the primary dispersion space.

3,878,092
CHROMATOGRAPHIC COLUMS

Edward N. Fuller, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 12, 1973, Ser. No. 340,355
Int. Cl. B01d *15/08*
U.S. Cl. 210—31 C **17 Claims**



1. A chromatographic column comprising:
a hollow member;
a partitioning agent disposed within the inner volume of said member, said agent comprising a continuous discrete film of a crosslinked polymeric material comprising a copolymer of at least one divinyl aromatic hydrocarbon and at least one monovinyl aromatic hydrocarbon, wherein said divinyl aromatic hydrocarbon is present in said copolymer in an amount ranging from 20 to 75 weight percent; and
a coupling agent, said coupling agent being disposed as an essentially continuous discrete film between said crosslinked polymeric partitioning agent and said hollow member, said coupling agent being integrally bonded at least chemically through valence bonds to the inner surface of said hollow member and to said partitioning agent by a bonding means selected from the group consisting of chemically bonding through valence bonds, physical interlocking or a combination of chemical and physical means.

3,878,093
SEPARATING YEAST AND/OR BACTERIAL CELLS FROM A LIQUID MEDIUM

Diamond Pirbhai Kanani; Peter John Sherrington, and David Charles Steer, all of Stockton-on-Tees, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Feb. 23, 1973, Ser. No. 335,109
Claims priority, application United Kingdom, Mar. 3, 1972, 9981/72
Int. Cl. A23j *1/00*
U.S. Cl. 210—51 **9 Claims**

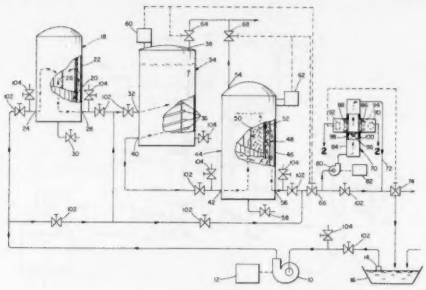
1. A method for separating bacterial cells from an aqueous medium wherein the cells are flocculated, by heating the medium to a temperature within the range 50° to 200°C and thereafter lowering the pH of the medium to a value within the range 2 to 5 by treatment with an acid, and the flocculated cells are separated from the medium.

3,878,094
SYSTEM FOR SEPARATING HYDROCARBONS FROM WATER

James D. Conley, Tulsa, Okla.; Donald E. Belden, Sand Springs, Okla., and Ralph D. Terhune, Tulsa, Okla., assignors to Fram Corporation, East Providence, R.I.

Filed Nov. 27, 1972, Ser. No. 309,660
Int. Cl. B01d *21/24*
U.S. Cl. 210—96 **1 Claim**

1. In a system for removing hydrocarbon pollutant from a water stream to provide a purified effluent stream, that improvement comprising a separator for removing from said stream free and entrained hydrocarbon, said separator having separate hydrocarbon and water outlets, a mechanical emulsion breaker for removing emulsified hydrocarbon from said stream, said emulsion breaker having an inlet connected to said separator water outlet, a control mounted to continuously sense the hydrocarbon-water interface in said separator, and valves for controlling the flow rates through said outlets, said control being connected to said valves for adjustment of said flow rates in response to changes in the position and said

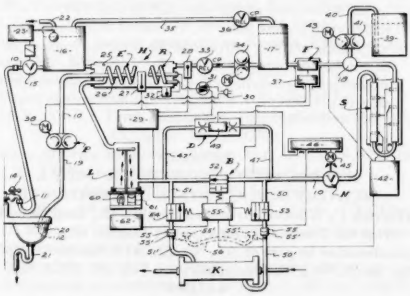


interface to counteract changes therein, said system being closed and pressurized and a fluid analyzer and associated conduit means for continuously sampling the water effluent from said emulsion breaker and returning the sample to said effluent stream, said analyzer including means for initiating the recycling of said effluent when hydrocarbon concentration therein reaches a threshold, while continuing to sample said effluent.

3,878,095
DIALYSIS APPARATUS

Jordan D. Frasier, and Albert Stevens, both of Orange, Calif., assignors to Advanced Medical Sciences, Inc., Lawndale, Calif.

Filed May 2, 1974, Ser. No. 466,397
Int. Cl. B01d *31/00*
U.S. Cl. 210—87 **8 Claims**



1. An apparatus of the character referred to comprising an elongate sectional flow passage with upstream and downstream ends, an input tank at and connecting with the upstream end portion of the passage, and vented to atmosphere, water supply means communicating with the input tank to maintain a substantially uniform predetermined volume of water therein, an elongate vertical holding tank interposed in the passage downstream of the holding tank, an air and water return line between the upper portion of the holding tank and the input tank, a pump interposed in the passage between said tanks with its suction side directed upstream and operable to move a greater volume of water than flows through the apparatus, a first pressure relief valve interposed in the passage between the pump and the input tank and maintaining a predetermined air fractionating negative pressure on the water

between said valve and pump, a second pressure relief valve interposed in the return line and maintaining a predetermined positive head pressure on the water in the holding tank, dialysate concentrate supply means communicating with the passage downstream of the holding tank to introduce concentrate into the water and establish a dialysate solution in the passage, a discharge pump with its suction side connected with the downstream end of the passage, a flow restricting variable valve interposed in the passage between the concentrate supply means and the discharge pump and maintaining a positive back pressure on the solution and water in the passage upstream thereof and in the holding tank and a negative pressure on the solution in the passage downstream thereof and upstream of the discharge pump, a hemo dialyzer with solution inlet and outlet ends, connecting means to connect the inlet and outlet ends of the dialyzer with upstream and downstream sections of the passage between the variable valve and the discharge pump and a waste line communicating with the discharge side of the discharge pump.

3,878,096
CONTINUOUS FILTRATION PLANT

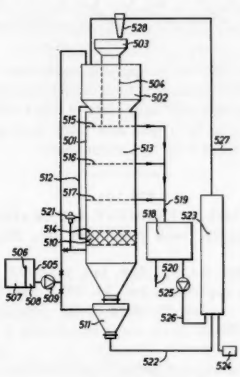
Francis Paul Somogyi, 17 Waterloo Pl., London, England

Continuation of Ser. No. 110,008, Jan. 27, 1971, abandoned. This application June 27, 1973, Ser. No. 375,983

Claims priority, application United Kingdom, Feb. 2, 1970, 4940/70; Apr. 21, 1970, 19074/70

Int. Cl. B01d *23/26*

U.S. Cl. 210—110 **6 Claims**



1. An apparatus for the continuous filtration of a liquid, comprising, a porous bed of discrete material, a vessel which is capable of containing said porous bed of discrete material which is movable in counter-current to the liquid to be filtered, said vessel being structured such that the height of the vessel section which will contain said porous bed of discrete material to the diameter of the vessel has a ratio of not greater than 5:1; inlet pipe means connected to the bottom of said vessel and through which the liquid to be filtered can flow into said vessel; an outlet pipe means connected to said vessel and spaced vertically from said inlet pipe means for permitting the outflow of the filtered liquid; a plurality of drainage devices positioned at spaced vertical intervals intermediate the top and bottom of said vessel and connected to said liquid outlet pipe means to allow uniform drainage of liquid from said porous bed of discrete material; each drainage device extending over substantially the whole cross sectional area which will contain said porous bed of discrete material, with the filtered liquid flowing from said vessel out of said drainage devices; each of the drainage devices comprising inverted circular channels having upper and lower openings therein, channel manifolds internal of the vessel and communicating with said circular channels through said upper openings, and a main drainage manifold external of the vessel and communicating with the channel manifolds, the lower openings in said circular channels communicating with said porous bed of discrete material and receiving the upwardly moving liquid therein and channeling said received liquid through the upper openings and into the channel manifolds for subsequent movement out of the vessel through the main drainage manifold, the inverted circular channels concentrically inscribing and lying over the full cross-sectional area of said porous bed of discrete material thereby to remove liquid uniformly from said porous bed of discrete material in the plane in which the lower openings lie; inlet means for receiving the discrete material for said porous base of discrete material, at the top of the vessel; at least one outlet means for discharging the discrete material from said porous bed of discrete material positioned at the base of said vessel, the outlet means comprising a plate of substantially the same area as the cross-sectional area of the vessel in the plane in which the plate lies, the plate having a plurality of circular openings, a plurality of funnels connected one each to one each of the circular openings, the discrete material from said porous bed of discrete material moving through the funnels for discharge from the vessel; means for controlling within the vessel the rate at which the discrete material from said porous bed of discrete material is discharged from the vessel, said means comprising a gate at the base of each of the funnels for controlling the movement of discrete material from said porous bed of discrete material through the circular openings and the funnels connected thereto; and means for receiving the discharged discrete material from said porous bed of discrete material and at least portions of the filtered liquid for cleaning the discharged discrete material from said porous bed of discrete material.

3,878,097
CONTAMINATED WATER TREATING APPARATUS

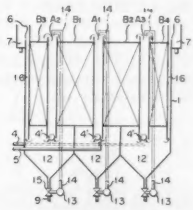
Tadao Mochizuki, No. 648-735, Hatsutomi, Kamagaya-machi, Higashi Katsushika-gun, Chiba Prefecture, and Koichi Kawada, Tokorozawa, both of Japan, assignors to said Mochizuki, by said Kawada

Filed Dec. 29, 1972, Ser. No. 319,714

Claims priority, application Japan, July 31, 1972, 47-90071

Int. Cl. B01d *23/02*

U.S. Cl. 210—151 **3 Claims**



1. An apparatus for biologically improving the quality of contaminated water, comprising a plurality of at least three side by side oxidation compartments spaced at intervals from each other, each being open at the top and bottom, said compartments having end walls defining between the adjacent compartments vertically extending aeration compartments, a biological oxidation section disposed within and filling the cross section of each oxidation compartment with the end walls of the compartment extending upwardly beyond the oxidation section so as to act as an overlflow for water coming up through the aeration compartments, aeration means at the lower end of each aeration compartment for feeding a flow of air into the bottom of the aeration compartments for establishing a circulating flow of contaminated water for lifting con-

taminated water up through said aeration compartments and over the upper ends of the compartment walls, a bottom beneath said compartments and having partitions extending upwardly to the bottoms of the biological oxidation sections in each oxidation compartment which lies between two aeration compartments to define sludge collection compartments beneath each aeration compartment and a portion of the oxidation compartment lying on each side of the respective aeration compartments, an overflow passage extending upwardly from the sludge collection compartment lying beneath the aeration compartment adjacent one end of the plurality of compartments to a level just slightly above the top of the biological oxidation sections with an overflow at the top thereof, and a contaminated water supply pipe opening into the lower end of the aeration compartment which is adjacent the other end of the plurality of oxidation compartments to supply contaminated water thereinto.

3,878,098

ACTIVATOR SOLUTION CONTAINING COPPER (II) IONS, HALIDE AND A MILD OXIDIZING AGENT

Ralph Kingsley Blake, Westfield, N.J., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 60,619, Aug. 3, 1970, Pat. No. 3,736,871, which is a continuation-in-part of Ser. No. 864,867, Oct. 8, 1969, abandoned. This application Nov. 15, 1972, Ser. No. 306,620

Int. Cl. A61l *13/00*

U.S. Cl. 252—186 **7 Claims**

1. An activator solution comprising an aqueous solution having a pH of 0.5 – 6.0 containing

a. copper (II) ions in a concentration of 0.01 molar to about 2.0 molar;

b. a water-soluble, inorganic halide yielding a halogen ion forming a silver salt no more soluble in water than silver chloride in a concentration of 0.01 to 0.5 molar;

characterized in that the activator contains an oleophilogenic compound in a concentration of 0.1 to 10 grams or more per liter of solution.

3,878,099

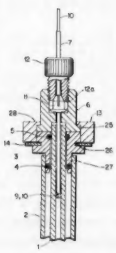
MOUNTING FOR LIQUID CHROMATOGRAPH COLUMN

David G. Ogle, Sunnyvale, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Apr. 8, 1974, Ser. No. 458,645

Int. Cl. B01d *15/08*

U.S. Cl. 210—198 C **13 Claims**



1. A mounting for a water-jacketed liquid chromatograph column comprising a pressurized tube containing component-separating resin, having an outside surface, and having first and second ends with inlet and outlet connections for eluent, and a hollow cylinder surrounding the tube and having lateral inlet and outlet connections to form a water jacket and having cylindrical surfaces with first and second ends, wherein the improvement comprises:

a first end fitting surrounding the tube and receiving the first end of the tube,

a second end fitting surrounding the tube and receiving the second end of the tube,

sealing means between the fittings and the outside surface of the tube,

sealing means between the fittings and a cylindrical surface of the hollow cylinder,

a column support member capable of withstanding force,

a first connector engaging said support member and said first fitting, and

a second connector engaging said support member and said second fitting, whereby the tube and the hollow cylinder are free to elongate and contract, and internal pressure in the tube and in the cylinder acting longitudinally acts against the fittings to be taken up by the column support member without subjecting the tube or the cylinder to longitudinal force or tensile strain.

3,878,100

SEPARATION MEDIUM

Harris J. Bixler, Camden, Maine, assignor to Marine Colloids, Inc., Rockland, Maine

Filed Feb. 1, 1973, Ser. No. 328,843

Int. Cl. B01d *15/08*

U.S. Cl. 210—198 C **12 Claims**

1. A medium for use in applying molecular diffusion or affinity separation processes to a liquid composition, said medium comprising a thin layer plate of dried solid absorbent material hydratable to a gel, said layer having its surface scored at intervals of 0.05 to 1 millimeter.

3,878,101

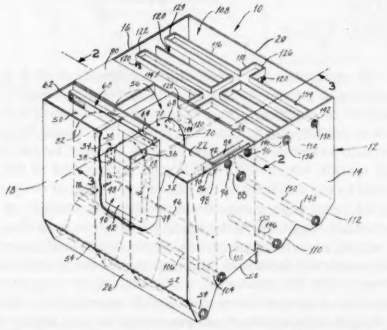
SEWAGE TREATMENT APPARATUS

Sterling R. Kennedy, 3460 Hollenberg Dr., Bridgeton, Mo. 63044

Division of Ser. No. 222,229, Jan. 31, 1972, Pat. No. 3,809,245. This application Jan. 21, 1974, Ser. No. 435,262

Int. Cl. B01d *21/00*

U.S. Cl. 210—202 **29 Claims**



1. Apparatus for treating sewage comprising sewage inlet means, a primary liquid circulation chamber communicating with said inlet means for circulating sewage entering said inlet means, said chamber having a first outlet means for removing liquid from said circulation chamber, and first circulating means for circulating sewage around said first outlet means, circulation of said sewage causing sludge in the sewage to

move radially away from the first outlet means such that relatively sludge-free liquid passes through said first outlet means, and liquid collection means for collecting liquid passing through said primary circulation chamber, said liquid collection means including a pooling chamber for collectively pooling circulated liquid and skimming means for removing an upper surface layer of said pooled liquid.

3,878,102

LOCKING MEANS FOR FILTER PLATES IN A FILTER PRESS

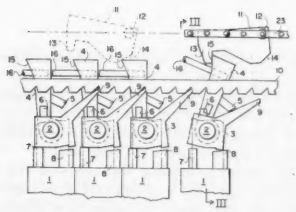
Oswald Busse, and Hugo Klesper, both of Aarbergen, Germany, assignors to Passavant-Werke Michelbacher Hutte, Aarbergen, Germany

Filed Oct. 12, 1973, Ser. No. 405,828

Claims priority, application Germany, Oct. 19, 1972, 2251367

Int. Cl. B01d *25/12*

U.S. Cl. 210—230 **11 Claims**



1. In apparatus for locking filter plates in a filter press embodying a plurality of filter plates movable longitudinally along guides:

a. at least one rack-like member extending longitudinally of the filter press in the direction of movement of said filter plates with said filter plates being adapted for movement relative to said rack-like member,

b. at least one movable actuating member carried by each filter plate and movable selectively to an operative position in engagement with said rack-like member and to an inoperable position out of engagement with said rack-like member,

c. an elongated drive member movable longitudinally of the filter press,

d. hook-like members carried by said drive member with each hook-like member being movable selectively to an upper inoperative position and a lower operative position,

e. a lever arm carried by each filter plate and movable with said actuating member and extending into the path of movement of and engageable with said hook-like member to move said actuating member from its operative position in engagement with said rack-like member to its inoperative position out of engagement with said rack-like member and then shift said filter plate, and

f. means for moving said hook-like member out of engagement with said lever arm at the end of the shifting movement of each filter plate.

3,878,103

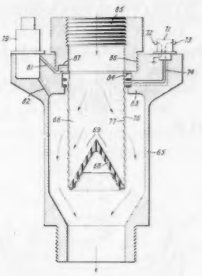
METAL CHIP DETECTING FILTER DEVICE

Charles C. Miller, Springfield, and William E. Rumberger, Newtown Square, both of Pa., assignors to The Boeing Company, Seattle, Wash.

Continuation of Ser. No. 283,120, Aug. 8, 1972, which is a division of Ser. No. 24,575, April 1, 1970, Pat. No. 3,686,926. This application Feb. 11, 1974, Ser. No. 441,195

Int. Cl. B01d *23/00*

U.S. Cl. 210—243 **1 Claim**



1. A cylindrically shaped woven wire screen comprising a plurality of electrical conductors and non-conductors, each of said conductors comprising two conductive members, said non-conductors being arranged substantially parallel to each other, said conductors being arranged substantially parallel to each other and perpendicular to said non-conductors, one of said conductive members of each conductor being woven so as alternately to cross over the other conductive member of said conductor and under said non-conductors, means to connect said conductors to an electrical source for electrically polarizing said conductors in a selected manner and a generally conical shaped insulator which closes one end of said screen.

3,878,104

POROUS EARTHENWARE SUPPORTING MEMBERS FOR REVERSE OSMOSIS MEMBRANES, PROCESS OF MANUFACTURE AND APPARATUS USING SAME

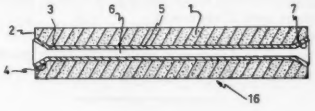
Jesus Martinez Guerrero, Mexico City, Mexico, assignor to Comision Para El Aprovechamiento De Aquas Salinas, Tecamachalco, D.F., Mexico

Filed Sept. 25, 1973, Ser. No. 400,744

Claims priority, application Mexico, Aug. 20, 1973, 145657

Int. Cl. B01d *31/00*

U.S. Cl. 210—323 **9 Claims**



1. A porous eathenware supporting member for reverse osmosis membranes comprising an elongated cylindrical earthenware body, a cylindrical longitudinal inner bore along the axis of said body and concentrical with the outer surface thereof, said cylindrical body having flat ends, said concentrical bore being open at both said flat ends and comprising an outwardly flaring taper at each of said ends, said cylindrical body comprising a porous earthenware material which is a calcined clayey highly-plastic-when-wet material of the montmorillonite type and having the condensed formula "$Al_2Si_4O_{10}(OH)_2$," said calcined earthenware material having fully interconnected pores throughout said body and of a size not

larger than 1 micron in their largest dimension, so as to provide for the free liquid intercommunication between the said bore and the outer surface of said body without appreciable pressure drop therethrough, said cylindrical earthenware body having a tensile strength sufficient to withstand radial outward pressures applied on the wall of said bore of up to about 100 Kg/cm^2, whereby a reverse osmosis membrane can be evenly adapted to said inner bore for effecting an outward high pressure flow of a liquid to be osmotically filtrated.

3,878,105

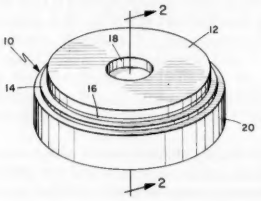
OPTICAL RADIATION TRANSMISSION AND DETECTION DEVICE

John P. Palmer, Pomona, Calif., assignor to General Dynamics Corporation, Pomona, Calif.

Filed May 28, 1974, Ser. No. 473,856

Int. Cl. H01j *39/12*

U.S. Cl. 250—211 R **5 Claims**



1. An optical detector for producing a change interelectrode electrical characteristics in response to incident optical radiation, and for transmitting a portion of said radiation, wherein the improvement comprises:

a base electrode layer,

a photosensitive layer,

an outer electrode layer having an optical radiation transmission opening therethrough,

said outer electrode layer comprising electrically conductive and optically opaque material substantially completely overlying said photosensitive layer excepting said opening and comprising an annulus around said opening, said base electrode layer substantially completely underlying said photosensitive layer an in electrical contact therewith and being open to the surrounding environment through said opening,

said photosensitive layer changes in effective electrical properties in an optically controlled region extending between said electrodes when exposed to optical radiation,

a portion of said optically controlled region underlies said opaque electrode layer,

said photosensitive layer passing at least a portion of said incident optical radiation,

said base electrode layer being transparent to at least a portion of said incident optical radiation passed by said photoconductive layer.

3,878,106

APPARATUS FOR SEPARATING A MASS BY FILTERING INTO A SOLID PORTION AND A LIQUID PORTION

Jean Albert De Smet, Wilrijk, Belgium, assignor to Extraction De Smet, Edegem, Belgium

Filed June 4, 1973, Ser. No. 366,359

Claims priority, application Luxembourg, June 8, 1972, 65488

Int. Cl. B01d *29/10*

U.S. Cl. 210—351 **3 Claims**

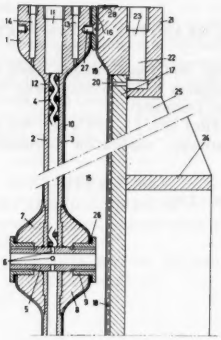
1. An apparatus for separating by filtering a wet mass into a solid portion and a liquid portion, said apparatus comprising:

a solid disc-shaped fixed wall having a central hub, an outer annular rim and a continuous central portion joining said hub and said rim;

a disc-shaped resilient liquid-impervious diaphragm attached at the center thereof to said hub and attached at the periphery thereof to said rim;

a disc-shaped fixed filtering wall fixed to said rim;

said filtering wall and said diphragm forming therebetween a disc-shaped chamber;



supply duct means for supplying said wet mass through said rim, said continuous central portion and said hub into said chamber, and for continuously passing a liquid portion of said mass from said chamber through said filtering wall during a normal operation when said diaphragm is retained against said solid wall; and

channel means extending through said rim into a space between said solid wall and said diaphragm for feeding a fluid into said space for selectively displacing said diaphragm toward said filtering wall at spaced intervals between normal operation.

3,878,107

ELECTRONICALLY COMPENSATED ROTATING GAS CELL ANALYZER

John D. Pembrook, Costa Mesa; Byron N. Edwards, and Darrell E. Burch, both of Orange, all of Calif., assignors to Philco-Ford Corporation, Blue Bell, Pa.

Filed June 24, 1974, Ser. No. 482,667

Int. Cl. G01n *21/34*

U.S. Cl. 250—343 **5 Claims**

1. In a radiant energy gas analyzer including a source of radiant energy, means for forming the output of said source into a beam, a multi-chambered gas correlation cell, said cell having associated means for passing said beam alternately through different chambers therein, said chambers being adapted to act in a wavelength selective manner on said radiant energy whereby said beam is conditioned at the rate of alternation, means for passing said conditioned beam through a sample region wherein a gas measurement is to be taken, means for selecting a predetermined portion of the frequency spectrum of said radiant energy, and a photodetector to convert said selected portion of the frequency spectrum into electrical energy whereby as said chambers in said cell are alternated in the path of said radiant energy said electrical energy will contain signal elements proportional to the quantity of said gas in said sample region, an electronic signal processing system comprising:

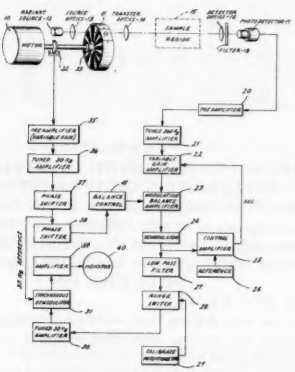
output indicating means for displaying signal magnitude,

a first amplifier connected in the circuit intermediate between said photodetector and said output indicating means,

a modulator connected to said first amplifier to cause the gain of said first amplifier to vary in phase with a reference signal supplied to said modulator,

means for adjusting the amount of gain change applied by said modulator,

means for generating a reference signal in synchronism with said alternation,



a second amplifier connected to said means for generating said reference signal to amplify said reference signal, said second amplifier including means for varying the amplitude and phase of the signal being amplified, and

means for applying the amplified reference signal to said modulator whereby a residual unbalance in the transmission characteristics of said chambers can be compensated by adjusting the phase of said second amplifying means and by adjusting the amount of gain change applied to said first amplifier by said modulator.

3,878,108

DOSIMETER TO BE WORN ON A FINGER

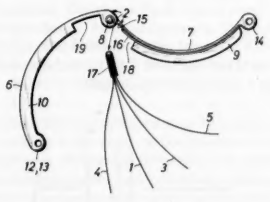
Bertram Burgkhardt, Karlsruhe; Ernst Piesch, Leopoldshafen; Heinz Schrodt, Karlsruhe; Klaas Buijs, Karlsruhe, and Johannes Pieter Vaane, Karlsruhe, all of Germany, assignors to Gesellschaft fur Kernforschung mbH, Karlsruhe, Germany

Filed June 1, 1973, Ser. No. 366,109

Claims priority, application Germany, June 14, 1972, 2228871

Int. Cl. G01t *5/00*

U.S. Cl. 250—472 **11 Claims**



1. A dosimeter to be worn on one finger of a person, comprising in combination:

a. a casing of arcuate shape for conforming to the contour of a person's finger in the circumferential direction thereof, a wall forming part of said casing, said wall having an outer face for contacting a person's finger, said wall having an inner face extending substantially parallel with said outer face; and

b. a stack of foils disposed in said casing and conforming to said inner face of said wall, said stack including at least one fission foil and at least one detector foil for detecting fission fragments leaving said fission foil.

3,878,109

AROMATIC POLYAMIDES FOR REVERSE OSMOSIS AND METHODS OF THEIR PERMSELECTIVE POLYMERIC MEMBRANES

Kojuro Ikeda; Ryoichi Bairinji, and Noriaki Dokoshi, all of Otsu, Japan, assignors to Toray Industries, Inc., Toyko, Japan

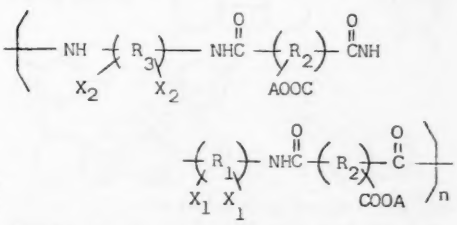
Filed Feb. 12, 1973, Ser. No. 331,689

Claims priority, application Japan, Aug. 30, 1972, 47-86118

Int. Cl. B01d *39/00*

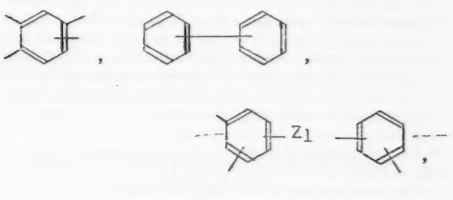
U.S. Cl. 210—500 M **6 Claims**

1. A permselective polymeric membrane consisting essentially of a synthetic organic aromatic polyamide represented by the formula:



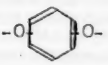
wherein

a. R_1 is a tetravalent benzoid group selected from the class consisting of

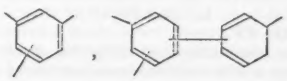


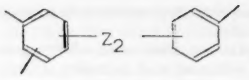
wherein Z_1 is a group selected from the class consisting of an alkylene (straight or branched chain) of 1-4 carbon atoms, —O—, —NH—, $—SO_2—$, —S—,

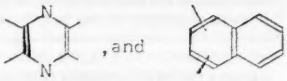
and



b. R_2 is a trivalent benzoid group selected from the class consisting of



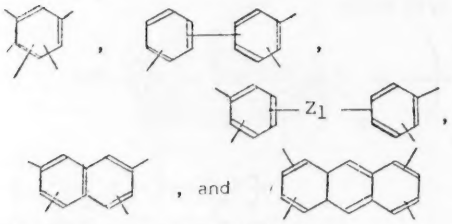




wherein Z_2 is a group selected from the class consisting of alkylene (straight or branched chain) of 1–4 carbon atoms, —O—,

and —S—

c. R_3 is a tetravalent benzoid group selected from the class consisting of



wherein Z_1 is the same group defined in (a),

d. X_1 and X_2 are groups selected from the class consisting of —R, —OR, —SR, —COOR, —NHR, —NRR and halogen, wherein R is hydrogen or a hydrocarbon radical of 1–6 carbon atoms,

e. —COOA represents —COOH or an ionic group selected from the class consisting of a carboxylic salt of an alkali metal, an alkaline earth metal, an organic amine salt and mixtures thereof, wherein the concentration of said ionic group in the said synthetic organic aromatic polyamide (PI) is 1/490 –1/215, where the value of said PI is determined according to the equation

$$P.I. = \frac{\text{(total number of pendant ionic groups in the polymer)}}{\text{(polymer molecular weight)}}$$

f. *n* is an integer sufficiently large to provide a film-forming molecular weight, and

g. said synthetic organic aromatic polyamide has a solubility of at least about 10 percent by weight in a solvent selected from the group consisting of dimethylformamide, dimethylacetamide, dimethyl sulfoxide, N-methylpyrrolidone, hexamethylsphosphoramide, and mixtures thereof at 25°C, said membrane having a water permeability of at least 1,000 and a solute passage through the membrane of less than 20 percent.

3,878,110

CLAY-FREE AQUEOUS SEA WATER DRILLING FLUIDS CONTAINING MAGNESIUM OXIDE OR CALCIUM OXIDE AS AN ADDITIVE

George L. Miller, Houston, Tex., and Horst K. F. Barthel, Hamburg, Germany, assignors to Oil Base, Inc., Houston, Tex., by said Miller and Oil Base Germany G.m.b.H., Hamburg, Germany, by said Barthel

Filed Oct. 24, 1972, Ser. No. 300,389
Int. Cl. E21c *41/10*
U.S. Cl. 252—8.5 B **20 Claims**

1. A clay free drilling fluid comprising an aqueous brine solution and a solid additive system comprising magnesium sulfate and dolomite together with at least one of the oxides of magnesium and calcium as a promoter to a reaction to increase the vescosity of the fluid sufficiently to enable the fluid to be weighted to a denisty of from 12 to 20 pounds per barrel.

3,878,111

DRILLING FLUIDS, ADDITIVES THEREFOR, AND STABILIZATION METHODS THEREFOR

Raymond E. McGlothlin, and Tom E. Cox, both of Houston, Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 862,516, Sept. 30, 1969, abandoned. This application Aug. 3, 1973, Ser. No. 385,355
Int. Cl. C10m *1/54*
U.S. Cl. 252—8.5 M **8 Claims**

1. An oil base drilling fluid additive consisting essentially of

1. at least one anionic emulsifier which is at least partially soluble in said oil base, and

2. at least one titanate selected from the group consisting of

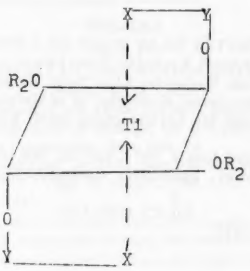
A. $Ti(OR)_4$

where R is one of alkyl, cycloalkyl, and aryl, each having from 1 to 22 carbon atoms per molecule, inclusive, the R's being the same or different in any given molecule;

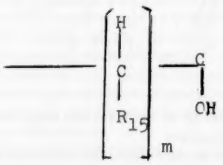
B. $Ti(OCOR_1)_{4-n}(OR_1)_n$

where *n* is 0 to 3, inclusive, R_1 is one of alkyl, cycloalkyl, and aryl, each having from 1 to 22 carbon atoms per molecule, inclusive, the R_1's being the same or different in any given molecule; and

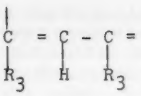
C. a chelate of the formula



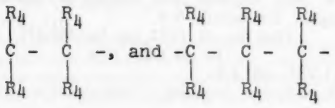
where X is one of oxygen, —OH and $—N(R''OH)_z$, R'' is alkyl having from 1 to 10 carbon atoms, inclusive, and *z* is 1 or 2; Y is one of



R_{15} being hydrogen or alkyl having from 1 to 10 carbon atoms, inclusive, and *m* is 1 or 2,



R_3 being alkyl having from 1 to 8 carbon atoms, inclusive,



R_4 being hydrogen or alkyl having from 1 to 4 carbon atoms, inclusive; and R_2 is one of hydrogen alkyl having from 1 to 10 carbon atoms, inclusive, and R_5OH where R_5 is alkylene having from 1 to 10 carbon atoms, inclusive, and

D. polyhydroxy stearate titanate

the emulsifier (1) and titanate (2) being present in a weight ratio 1)/2) of at least about 0.05/1.

3,878,112

LUBRICANT-REFRIGERANT SYSTEM FOR CENTRIFUGAL REFRIGERATION COMPRESSORS

Russell M. Luck, Monroeville, and Gordon C. Gainer, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 23, 1974, Ser. No. 472,772

Int. Cl. C10m *3/24, 3/20, 9/00*

U.S. Cl. 252—10 **3 Claims**

1. In a centrifugal refrigeration system employing a major proportion of a fluorocarbon refrigerant, in combination, a minor lubricating proportion of a synthetic lubricant in contact with the fluorocarbon, the fluorocarbon being only slightly soluble in the synthetic lubricant whereby the lubricant can be applied to bearings, gears and other relatively moving parts to lubricate effectively such relatively moving parts under both rapid start-up and long time operating conditions, the synthetic lubricant comprising essentially the diricinoleate ester of at least one diol having from 2 to 5 carbon atoms, the synthetic lubricant having a viscosity in the range of about 200 to 600 SUS at 100°F to about 40 to 90 SUS at 212°F, a pour point of from about −30° to =40°F, good thermal stability when in contact with metals and the fluorocarbon refrigerant at elevated temperatures, and good wear and load carrying lubricating capacity.

3,878,113

POLYPHENYLENE SULFIDE BONDED SOLID FILM LUBRICANT

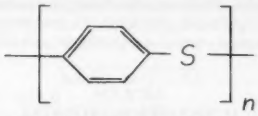
Mahlon E. Campbell, Overland Park, Kans., and William D. Walker, Independence, Mo., assignors to Midwest Research Institute, Kansas City, Mo.

Filed Mar. 14, 1973, Ser. No. 341,303

Int. Cl. C10m *7/40, 7/06, 7/02*

U.S. Cl. 252—12 **6 Claims**

1. A solid film lubricant adhered to a bearing surface, said lubricant comprising a dry layer of finely divided, solid phase lubricating pigments dispersed throughout a polyphenylene sulfide binder, said pigments and said binder being present in major and minor proportions by weight respectively with the weight ratio being such as to provide the solid film lubricant with a relatively low friction coefficient and long wear life, said lubricant in a volatile carrier being coated on said surface with said binder in an initial, heat-curable state and cured on said surface by heating the lubricant to remove said carrier, and advancing the polymerization of said binder to a final, infusible state by further heating the lubricant to at least approximately 550° F. for a time period limited in duration to an extent to enhance the useful wear life of said layer, said pigments being resistant to thermal degradation at the curing temperatures, said binder having the recurring unit



wherein n in said initial state is from 6 to 12.

3,878,114

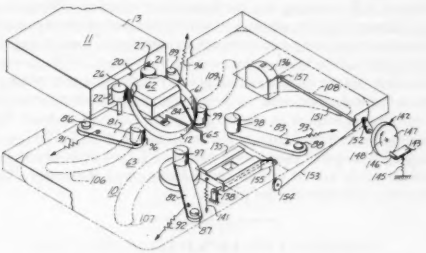
INFORMATION CARRIER

Joseph H. Lancor, Jr., deceased, late of Arcadia, Calif. (by Ellen B. Lancor, administratrix), and Arthur Rak, Huntington Beach, Calif., assignors to Bell & Howell Company, Chicago, Ill.

Filed Aug. 23, 1971, Ser. No. 173,945

Int. Cl. G03b *31/02*

U.S. Cl. 352—29 **33 Claims**



1. In a method of performing a function relative to an elongate information carrier located in a casing having an aperture across which a part of said information carrier extends within the confines of said casing, the improvement comprising in combination the steps of:

pushing a portion of said elongate information carrier past said confines through said aperture by pushing said elongate information carrier in a direction from one side of said aperture to an opposite side of said aperture at a location adjacent said one side of said aperture, and by resisting motion of said elongate information carrier in said direction at a location adjacent said opposite side of said aperture while retaining the ends of said elongate information carrier inside said casing;

forming said portion into a loop extending out of said aperture and outside of said casing, and

performing said function on said elongate information carrier outside said casing.

3,878,115

LUBRICATING COMPOSITIONS FOR MARINE DIESEL ENGINES

George Jules Souillard, and Frederic Francois Van Guaethoven, both of Wezembeek, Belgium, assignors to Labofina S.A., Brussels, Belgium

Filed Dec. 11, 1973, Ser. No. 423,690

Claims priority, application Belgium, Dec. 19, 1972, 125511

Int. Cl. C10m *1/40, 1/18*

U.S. Cl. 252—33.4 **5 Claims**

1. A lubricating composition for marine diesel engines comprising (1) 50 to 90 parts by weight of mineral base oil, (2) 50 to 10 parts by weight of a mixture of polymers all having a molecular weight below about 1500 and selected from the group consisting of hydrogenated and non-hydrogenated polybutenes and polyisobutylenes, said mixture

comprising a polymer having a Saybolt viscosity at 210°F of between 150 and 3,000 SSU and a lower molecular weight polymer having a Saybolt viscosity at 210°F of between 40 and 100 SSU, the higher molecular weight and lower molecular weight polymers of said mixture being in the ratio of 4:1 to 1:1, and (3) super-basic additive, said lubricating composition having an alkalinity index of between 60 and 70.

3,878,116

OVERBASED SULFONATES

Hans J. Rueckert, Van Nuys, Calif., assignor to Bray Oil Company, Los Angeles, Calif.

Filed Sept. 9, 1970, Ser. No. 70,857
Int. Cl. C10m *3/34, 3/02*
U.S. Cl. 252—33.4 **8 Claims**

1. The process of making a lubricating oil additive of high alkali value wherein an oil-soluble sulfonate of a metal of Group II is mixed in a first stage with a complex formed from the oxide of said metal with anhydrous methanol and carbon dioxide, in the presence of a hydrocarbon solvent boiling above methanol, the amount of metal in said complex being sufficient to impart to said oil and alkali value of at least 250, distilling methanol from the mixture at a temperature of at least 220°F., treating the methanol-free mixture with water in an amount equal to about 1 to 4 mols per mol of oxide present, thereby converting said complex to carbonate, inert to gelling, dehydrating the mixture by heating to at least 250°F., cooling the dehydrated oil and colloidal inert carbonate and mixing it in a second stage with sufficient metal oxide-methanol-CO_2 complex to impart to the oil an alkali value of at least 400, stripping methanol from said complex to at least 220°F., treating with water in proportion of about 1 to 4 mols per mol of metal oxide added in said second stage and thereafter dehydrating and filtering the product oil.

3,878,117

NOVEL BENZOTHIAZYL DISULFIDES, THEIR PREPARATION AND USE AS LUBRICANT ADDITIVES

Ralph P. Williams, and Rector P. Louthan, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 17, 1973, Ser. No. 361,242
Int. Cl. C10m *1/42*
U.S. Cl. 252—47 **6 Claims**

1. An improved lubricating composition comprising major amounts of a mineral lubricating oil having incorporated herein a small minor amount of a tert-alkyl 2-benzothiazyl disulfide selected from the group consisting of 1, 1, 3, 3-tetramethylbutyl 2-benzothiazyl disulfide and a mixture of isomeric tert-nonyl 2-benzothiazyl disulfides and isomeric tert-decyl 2-benzothiazyl disulfides sufficient to improve at least one of the properties of the resulting lubricating composition, said properties including antiwear and extreme pressure characteristics and stability toward oxidation and rust.

3,878,118

SELF-HEATING CHEMICAL COMPOSITIONS

Hugh R. Watson, Wargrave, England, assignor to Wilkinson Sword Limited, London, England

Continuation-in-part of Ser. No. 855,395, Sept. 4, 1969, abandoned. This application June 30, 1972, Ser. No. 268,019
Claims priority, application United Kingdom, Sept. 6, 1968, 42458/68
Int. Cl. C11d *3/20*
U.S. Cl. 252—90 **11 Claims**

1. A self-heating system comprising an oxidant selected from the group consisting of hydrogen peroxide and complexes thereof with urea, and a reductant selected from the group consisting of substituted glyoxylic acids and salts thereof, wherein the substituent in the substituted glyoxylic acids and salts thereof is a member selected from the group consisting of substituted and unsubstituted phenyl groups and the molar ratio of oxidant to glyoxylic acid groups or glyoxylic acid salt groups in the reductant is from 40:60 to 70:30.

3,878,119

PREPARATION OF RARE-EARTH OXYSULFIDE PHOSPHORS

Dilip K. Nath, Mayfield, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 26, 1972, Ser. No. 318,171
Int. Cl. C09k *1/14*
U.S. Cl. 252—301.4 S **4 Claims**

1. A method of preparing a luminescent material which comprises:

a. blending phosphor crystals having the following chemical composition:

$$Ln_{(2-x)}Ln'_xO_2S$$

wherein Ln is one or more of Y, Gd, La, and Lu, and Ln' is one or more of Dy, Er, Eu, Ho, Nd, Pr, Sm, Tb, and Tm, and x is from 0.0002 to 0.2 with a flux composition selected from a preformed vitreous flux and source materials which form said vitreous flux in situ; said flux composition consisting essentially of an alkali metal oxide selected from the group consisting of lithium, sodium, and potassium oxides together with an oxide selected from the group consisting of SiO_2, GeO_2, and B_2O_3 including mixtures thereof, at a molar ratio between the alkali metal oxide and each of said SiO_2, GeO_2, and B_2O_3 in the flux composition which ranges from 0.5 to 1.0 and 1.0 to 0.5, wherein the weight ratio of the flux composition is from 0.1 to 7 weight percent of the luminescent material, and b. firing the blended product in the approximate temperature range 1000°C–1350°C in an inert atmosphere for a sufficient time period to recrystallize the phosphor crystals having uniformly dispersed therein the vitreous flux.

3,878,120

PROCESS FOR PREPARING LIQUID DEVELOPER FOR ELECTROSTATIC IMAGES

Shinichiro Nagashima, 1-566, Nishi Tamachi, Suginami-ku, Tokyo; Hiroyuki Shimamune, 2-10, Hatsudai, Shibuya-ku, Tokyo, and Terukuni Tsuneda, 1622, Kami Chiba-cho, Katsushika-ku, Tokyo all of Japan

Continuation of Ser. No. 144,285, May 17, 1971, which is a continuation of Ser. No. 864,647, Jan. 28, 1968, abandoned. This application Sept. 17, 1973, Ser. No. 397,804
Claims priority, application Japan, Nov. 28, 1966, 41-77879; Apr. 23, 1967, 42-25704
Int. Cl. G03g *9/00*
U.S. Cl. 252—62.1 L **4 Claims**

1. A process for preparing an emulsion liquid developer for electrostatic images consisting essentially of a carrier liquid having a high electrical resistance such that the conventional electrostatic images are not destroyed and a developer phase liquid immiscible with said carrier liquid which comprises adding a solvating agent which is soluble in both the carrier liquid and the developer phase liquid to the carrier liquid and subsequently adding the developer phase liquid to the carrier liquid and solvating agent to disperse the developer phase liquid and to provide an emulsion liquid developer; wherein the carrier liquid is selected from the group consisting of petroleum solvents, aliphatic hydrocarbons, dimethyl polysiloxane and chlorinated fluorinated hydrocarbons; the developer phase liquid is a liquid resin selected from the group consisting of xylene-formaldehyde resin, polyester resin and epoxy resin; and the solvating agent is selected from the group consisting of aromatic hydrocarbons, aliphatic acids having 8 to 18 carbon atoms, cyclohexanone, rosin, hydrogenated rosin and hydrogenated rosin esters and is from 0.2 to 4 times the weight of the developer phase liquid.

3,878,121

METHOD OF ENCAPSULATION BY COACERVATION, AND THE SUBSTANCES OBTAINED

Gerard Roche, Viry Chatillon, and Bernard Dumas, Vert le Grand, both of France, assignors to Societe nationale des Poudres et Explosifs, Paris, France

Filed Dec. 7, 1972, Ser. No. 312,932

Claims priority, application France, Dec. 28, 1971, 71.47022

Int. Cl. B01j *13/02*; B44d *1/02*, *1/44*

U.S. Cl. 252—316 11 Claims

1. A method of encapsulating a solid substance which is highly reactive with the water in the ambient atmosphere, by coacervation, which comprises preparing a solution of a polyurethane resin in a mixture of at least two solvents which do not react with said substance, dispersing in the said solution discrete particles of said solid substance, adding to said dispersionn a supplemetary volume of one of said solvents whereby the resin undergoes coacervation and deposits on the dispersed particles, dispersing the resulting mixture in a slightly polar liquid non miscible with the mixture and containing a diisocyanate compound whereby cross-linking of the polyurethane results, stirring the dispersed mixture, separating and drying the encapsulated particles of said solid substance.

3,878,122

REGENERATION OF RUTHENIUM HYDRIDE COMPLEX ISOMERIZATION CATALYSTS

Filippo Pennella, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 26, 1973, Ser. No. 409,810

Int. Cl. B01j *11/02*

U.S. Cl. 252—411 R 4 Claims

1. A process for rejuvenating or maintaining activity of a ruthenium hydride complex olefin isomerization catalyst having the formula

$(R_2Q)_3RuH_2Z$

wherein

Q is selected from phosphorus, arsenic and antimony,

Z is selected from H_2, N_2 and NH_3, and

R is an organic radical containing up to 20 carbon atoms, which process comprises contacting said catalyst at a temperature in the range of from about −100° C. to about 70° C. with hydrogen, the amount of hydrogen employed being in the range from about 1 to 1000 moles of hydrogen per mole of said catalyst but the amount of hydrogen being insufficient to cause substantial hydrogenation of olefins in contact with said catalyst.

3,878,123

ODOR FREE HYDROXYMETHANESULFONIC ACID

Robert M. Reinhardt, New Orleans; Russell M. H. Kullman; Norton A. Cashen, both of Metairie, and John D. Reid, New Orleans, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Oct. 10, 1973, Ser. No. 404,979

Int. Cl. C07c *143/10*

U.S. Cl. 252—426 2 Claims

1. A process for the preparation of hydroxymethanesulfonic acid solution, free of noxious, disagreeable sulfur dioxide odors, by the reaction of equimolar quantities of sulfurous acid and paraformaldehyde.

3,878,124

OLEFIN POLYMERIZATION CATALYSTS AND METHOD FOR PREPARATION OF SAME

Daniel Durand; Michel Avaro, and Pierre Mangin, all of Martigues, France, assignors to Naphtachimie, Paris, France

Filed June 23, 1972, Ser. No. 265,652

Claims priority, application France, June 30, 1971, 71.23862

Int. Cl. B01j *11/84*

U.S. Cl. 252—429 B 5 Claims

1. Catalysts for the polymerization of olefins consisting essentially of a precipitate, prepared by the reaction at a temperature within the range of −20° to 150°C in an inert solvent of (1) an aliphatic organo-magnesium compound, selected from the group consisting of compounds having the general formulae

R′—Mg—X and R′—Mg—R″

in which R′ and R″ represent an aliphatic hydrocarbon radical and X represents a halogen atom, (2) monohalogenated aliphatic hydrocarbon, and (3) a transition metal compound selected from the group consisting of a titanium derivative having the general formula

$TiX_{4-m}(OR)_m$

in which X represents a halogen atom, R represents an alkyl radical having from 2–8 carbon atoms and *m* is an integer within the range of 0–4, vanadium tetrachloride, vanadium tetrabromide, vanadium oxychloride and vanadium oxybromide the ratio between the number of atoms of the transition metal and the number of magnesium atoms of the organomagnesium compound being up to 0.33 and the ratio between the number of organic radicals of the monohalogenated hydrocarbons and the number of organic radicals in the organomagnesium compound is at least 1, and separating the precipitate from the reaction mixture.

3,878,125

MULTIMETALLIC CATALYST COMPOSITE

Roy T. Mitsche, Island Lake; John C. Hayes, Palatine; Frederick C. Wilhelm, Arlington Heights, and Richard E. Rausch, Mundelein, all of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Division of Ser. No. 287,322, Sept. 8, 1972, Pat. No. 3,821,185, which is a continuation-in-part of Ser. No. 214,396, Dec. 30, 1971, Pat. No. 3,702,293, which is a division of Ser. No. 34,539, May 4, 1970, Pat. No. 3,660,309. This application Nov. 29, 1973, Ser. No. 420,336

Int. Cl. B01j *11/78*, *11/40*

U.S. Cl. 252—441 15 Claims

1. A catalytic composite comprising a combination of catalytically effective amounts of a platinum or palladium component, and iridium component and a Group IVA metallic component with an alumina carrier material containing about 0.1 to about 20 wt. % of finely divided zeolitic crystalline aluminosilicate.

7. A catalytic composite defined in claim 1 with a catalytically effective amount of a halogen component.

3,878,126

CATALYSTS FOR OXIDIZING ETHYLENE TO ETHYLENE OXIDE

Giambattista Antonelli, Brugherio; Natale Ferlazzo, and Giancarlo Aglietti, both of Milan, all of Italy, assignors to Societa' Italiana Resine S.I.R. S.P.A., Milan, Italy

Filed Oct. 27, 1972, Ser. No. 301,399

Claims priority, application Italy, Nov. 17, 1971, 31199/71The portion of the term of this patent subsequent to Dec. 25, 1990, has been disclaimed.

Int. Cl. B01j *11/08*

U.S. Cl. 252—447 5 Claims

1. Process for the production of silver-based supported catalysts which can be used in the oxidation of ethylene to produce ethylene oxide, by impregnation of an inert and granular alumina support with a member selected from the

group consisting of (1) a decomposable silver carboxylate which upon heating decomposes to yield gases, (2) a suspension of carbon and at least one metal selected from the group consisting of platinum, gold, and palladium in a solution of silver lactate in lactic acid, and (3) initially an aqueous suspension comprising silver oxide and (a) at least one metal or metallic oxide selected from the group consisting of platinum, palladium and gold, or (b) at least one oxide selected from the group consisting of barium and calcium, followed by drying, and then impregnated with an aqueous solution comprising one or more organic acids selected from the group consisting of acetic, tartaric, lactic, citric, maleic, and isomaleic, drying the impregnated particles and carrying out a heat treatment of the dried product at elevated temperature, characterized in that the said heat treatment is carried out:

by raising the particles of dried catalyst to a temperature ranging from 270 to 350°C in a nitrogen atmosphere, while the nitrogen and the gases which develop from decomposition of the decomposable silver salts are recycled through the particles of catalyst at the rate of 0.1 to 30 l/hr and per g of catalyst and for a period of 1 to 10 hours;

followed by the addition to the gaseous mixture of oxygen, its final content being brought to 20% in a period of not less than 5 hours, the gaseous mixture still being kept flowing through the particles of catalyst at a rate of 0.1 to 30 l/hr and per g of catalyst.

3,878,127

METHOD OF MANUFACTURING A ZEOLITIC ABSORBENT

Donald H. Rosback, Elmhurst, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed May 2, 1973, Ser. No. 356,666

Int. Cl. B01j *11/40*

U.S. Cl. 252—455 Z **10 Claims**

1. A method of manufacturing a solid adsorbent which method comprises the steps of:

a. contacting a precursor mass containing a sodium X or Y zeolite and amorphous material having an Na_2O/Al_2O_3 ratio less than 0.7 with an aqueous sodium hydroxide solution at first ion exchange conditions to effect the addition of sodium cations to the zeolite structure;

b. treating the sodium-exchanged mass at second ion exchange conditions to effect the essentially complete exchange of sodium cations with barium or barium and potassium cations; and,

c. drying the resulting exchanged mass at conditions to reduce the LOI at 900° C. to less than about 10 wt. %.

3,878,128

METHOD FOR MANUFACTURING AN ADSORBENT USEFUL FOR OLEFIN SEPARATION

Donald H. Rosback, Elmhurst, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Sept. 28, 1973, Ser. No. 401,782

Int. Cl. B01j *11/40*

U.S. Cl. 252—455 Z **13 Claims**

1. A method of manufacturing a solid adsorbent comprising the steps of:

a. contacting a base material comprising X or Y zeolite with a fluoride-containing aqueous solution of sodium hydroxide at ion exchange conditions to effect the addition of sodium cations to and the extraction of alumina from said base material;

b. washing the ion exchanged material at washing conditions until substantially free of sodium hydroxide;

c. drying the adsorbent at drying conditions to reduce the LOI at 900° C. to less than about 10 wt. %.

3,878,129

METHOD OF MANUFACTURING A ZEOLITIC ADSORBENT USEFUL FOR AROMATIC SEPARATION

Donald H. Rosback, Elmhurst, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 356,666, May 2, 1973. This application Sept. 28, 1973, Ser. No. 401,783

Int. Cl. B01j *11/40*

U.S. Cl. 252—455 Z **14 Claims**

1. A method of manufacturing a solid adsorbent comprising the steps of:

a. contacting a base material comprising X or Y zeolite with a fluoride-containing aqueous solution of sodium hydroxide at first ion exchange conditions to effect the addition of sodium cations to and the extraction of alumina from said base material;

b. treating the sodium-exchanged base material at second ion exchange conditions to effect the essentially complete exchange of sodium cations with barium or barium and potassium cations; and,

c. drying the thus exchanged base material at conditions to reduce the LOI at 900°C. to less than about 10 wt.%.

3,878,130

CATALYTICALLY ACTIVE SUBSTANCE FOR THE CONVERSION OF HIGHER HYDROCARBONS COMPRISING CO, LA, NI, AND U

Alfred Michel, and Christian Koch, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Feb. 22, 1973, Ser. No. 334,932

Claims priority, application Germany, Mar. 3, 1972, 2210365

Int. Cl. B01j *11/06, 11/32*

U.S. Cl. 252—458 **38 Claims**

1. A catalytically active substance for the conversion of higher hydrocarbons into gas mixtures, containing carbon monoxide, methane and/or hydrogen, comprising:

a catalyst comprising oxides of the metals lanthanum, cobalt, nickel and uranium in the proportions 55% to 92% by weight of lanthanum, 2% to 30% by weight of cobalt, 1% to 10% by weight of nickel, and 0.1% to 8% by weight of uranium, in each case relative to total metal content of the catalyst; and

an oxide catalyst carrier for said catalyst.

3,878,131

MULTICOMPONENT DEHYDROGENATION CATALYST

John C. Hayes, Palatine, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Division of Ser. No. 184,965, Sept. 29, 1971, Pat. No. 3,755,481, which is a continuation-in-part of Ser. No. 856,810, Sept. 10, 1969, Pat. No. 3,632,503. This application Jan. 24, 1973, Ser. No. 326,214

Int. Cl. B01j *11/08*

U.S. Cl. 252—466 PT **9 Claims**

1. A catalyst composite comprising a combination of a platinum group metal, tin oxide a germanium oxide and an alkali or alkaline earth metal oxide with a porous carrier material wherein the composite contains, on an elemental basis, about 0.01 to about 2 wt. % of the platinum group metal, about 0.01 to about 5 wt. % of tin, about 0.01 to about 5 wt. % germanium and about 0.01 to about 5 wt. % of the alkali metal or alkaline earth metal.

3,878,132

EPOXY RESINS WHICH ARE GLYCIDYL ETHERS OF GLYCERINE

James L. Bertram, Lake Jackson, Tex., and David O. Bowen, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 306,794, Nov. 15, 1972, abandoned. This application Dec. 26, 1973, Ser. No. 428,556

Int. Cl. C08g *30/02*

U.S. Cl. 260—2 EP 8 Claims

1. Epoxy resins of the glycidyl ethers of glycerine type which are the dehydrohalogenated reaction product of

A. a mixture comprising from about 0 to about 49 percent by weight of a polyhydroxy-containing compound free of epoxy groups and from about 51 to about 100 percent by weight of glycerine; with

B. a mixture comprising

1. from about 0.05 to about 0.65 epoxide equivalents per mole of (A) of a polyepoxide having more than one 1,2-epoxy groups which is a glycidyl ether of a dihydroxyl containing compound, and

2. from about 1.35 to about 2.95 epoxide equivalents per mole of (A) of an epoxy alkyl halide;

wherein the combined quantity of (B1) and (B2) is in the range of from about 2.0 to about 3.0 epoxide equivalents per mole of (A).

3,878,133

CUSHIONING AND MATERIALS THEREFOR

Louis C. Rubens, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 281,524, Aug. 17, 1972, abandoned. This application Dec. 20, 1973, Ser. No. 426,884

Int. Cl. C08g *22/44*, *41/04*

U.S. Cl. 260—2.5 BE 28 Claims

1. A composite foam structure, the composite foam structure being prepared by

an improved method for the preparation of composite foam materials wherein a self-reacting exothermic open cell flexible urethane foam forming composition is admixed with a particulate closed cell foam forming component and the composite cast or molded into a desired configuration, with the particulate component expanding or foaming during casting or molding, the improvement which comprises

employing as the closed cell foaming or expanding component a plurality of expandable styrene/acrylonitrile particles, the particles being a polymer of from about 8 to 40 weight percent acrylonitrile and from about 92 to 60 weight percent styrene, the particles having a volatile fluid foaming agent that is a poor solvent for the polymer and boils at a temperature below about 110°C., the unexpanded particles having a swelling ratio of from about 10 to 50 at 25°C. as determined in dimethylformamide and forming a coherent gel.

23. An unexpanded expandable synthetic resinous particle particularly suited as a component in a composite foam composition, the expandable particle comprising a styrene/acrylonitrile particle having a volatile fluid foaming agent therein, the volatile fluid foaming agent being a poor solvent for the polymer and boiling below about 110°C., the styrene/acrylonitrile particle being a polymer of from about 92 to 60 weight percent styrene and from about 8 to 40 weight percent acrylonitrile, wherein in its unexpanded form the particle shows a swelling ratio of from about 10 to 50 as determined at 25°C. in dimethylformamide and the particles forming a coherent gel.

3,878,134

ADHESION ASSISTANTS FOR PRODUCING COMPOSITE BODIES BY VULCANIZATION

Riza-Nur Ozelli, Neuss; Gunter Klement, Dusseldorf-Holthausen, and Edgar Lieske, Dusseldorf, all of Germany, assignors to Henkel & Cie GmbH, Dusseldorf-Holthausen, Germany

Filed June 11, 1973, Ser. No. 368,504

Claims priority, application Germany, June 12, 1972, 2228544

Int. Cl. C08c *9/14*

U.S. Cl. 260—4 R 8 Claims

1. An adhesion assistant or binder composition for use in the production of composite bodies by vulcanizing a vulcanizable rubber mixture on a substrate which is stable under vulcanization conditions consisting essentially of from 5% to 50% by weight of the following binder ingredients dispersible in inert organic solvents

a. from 10 to 30 parts by weight of chlorosulfonated polyethylene,

b. from 5 go 25 parts by weight of a di-C-nitroso aromatic compound,

c. from 20 to 40 parts by weight of an organic polyisocyanate,

d. from 10 to 30 parts by weight of chlorinated natural rubber,

e. from 5 to 20 parts by weight of a component selected from the group consisting of (1) a phenol resin of the resol type having reactive groups, (2) a compound having more than one epoxide group in the molecule consisting of diglycidyl ethers of diphenylolpropane having an epoxide oxygen content of 4 to 12 percent by weight, and (3) the mixtures thereof,

f. from 0 to 25 parts by weight of a pigment component, and

g. from 0 to 20 parts by weight of additional tack producing compounds and from 50 to 95 percent by weight of an inert organic solvent liquid at room temperature.

3,878,135

DENTURE ADHESIVE PREPARATION CONTAINING AN ANIONIC PROTEIN MATERIAL

James J. Keegan, Bloomfield; Girish Patel, Mine Hill, and Howard Rubin, Rockaway, all of N.J., assignors to Warner-Lambert Company, Morris Plaines, N.J.

Filed Oct. 15, 1973, Ser. No. 406,529

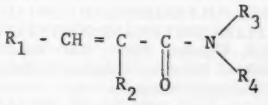
Int. Cl. C08f *3/90*, *29/00*, *45/14*

U.S. Cl. 260—8 16 Claims

1. A denture adhesive comprising a dry mixture of:

A. from about 1.0% to about 80% by weight, based on the total weight of the denture adhesive, of at least one cationic polymeric material selected from the group consisting of:

1. a copolymer of an acrylamide having the Formula (L):



(I)

wherein R_1 is methyl or hydrogen; and R_2, R_3, and R_4 are each hydrogen or 1 to 7 carbon lower alkyl, with a vinyl quaternary ammonium salt selected from the group consisting of trialkylaminoalkyl acrylate salts, trialkylaminoalkyl methacrylate salts, and vinyloxyalkyltrialkylammonium salts, wherein the alkyl group contains from 1 to 7 carbon atoms; and

2. a copolymer of an acrylamide having the Formula (I) above with a vinyl or alkyl-substituted vinyl pyridinium salt, wherein the alkyl group is 1 to 7 carbon lower alkyl; and

B. from about 10% to about 90% by weight, based on the total weight of the denture adhesive, of at least one ani-

onic protein material selected from the group consisting of soybean meal, sunflower seed meal, peanut meal or flours prepared therefrom.

3,878,136

PROCESS FOR THE MANUFACTURE OF DISPERSIONS OF THERMOSETTING PHENOLIC REACTION PRODUCTS

Heinz-Bernhard Höfel; Hans-Joachim Kiessling, both of Hamburg, and Fred Lampert, Barsbuttel Achtern Barg, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt/Main, Germany

Filed June 18, 1973, Ser. No. 370,768

Claims priority, application Switzerland, Sept. 19, 1972, 13674/72; June 19, 1972, 9197/72

Int. Cl. C08b *21/32;* **C08g** *37/14*

U.S. Cl. 260—14 **7 Claims**

1. Process for the manufacture of a water-dilutable, self-emulsified, aqueous dispersion of a thermosetting reaction product which comprises

a. warming an aqueous mixture of

1. phenol,

2. a substituted phenol having from 1 to 4 substituents on the phenol nucleus and having at least one ring carbon atom available for reaction with formaldehyde, and which substituted phenol has a speed of reaction which is 40 to 150 percent of the speed of reaction of unsubstituted phenol,

3. formaldehyde or a formaldehyde donor,

4. a secondary amine, and

5. an acid

until a sample of the dispersion reaction mixture has a B-time of 30 seconds to 10 minutes at 160°C, and

b. while stirring, cooling the mixture from step (a), said process being further characterized in the mixture of substituted phenol and phenol is employed in a ratio such that the average functionality of the sum of the phenolic compounds (1) and (2) relative to the formaldehyde component (3) is between 2.1 and 2.8, and the amount of formaldehyde in the mixture being so chosen that the molar ratio of the total sum of formaldehyde (3) to the sum of the phenolic compounds (1) and (2) ranges from about 0.9 to 1.5 to 1, and the secondary amine content (4) in the mixture ranges from about 50 to about 200 mol percent, relative to the total weight of the phenols (1) and (2), the amount of acid (5) in the mixture being equivalent to the secondary amine (4), the amount of water in the mixture, including added water and water of reaction, ranging from 30 to 60 percent by weight, relative to the weight of the total mixture.

3,878,137

CURABLE MOLDING COMPOSITIONS BASED ON UNSATURATED POLYESTERS AND CONTAINING ACID CELLULOSE ESTERS AND POLYSTYRENE

Bernhard Hess, Kapellen, Moers, Karl Raichle, Krefeld-Bockum, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Sept. 13, 1973, Ser. No. 397,142

Claims priority, application Germany, Sept. 20, 1972, 2246105

Int. Cl. C08g *39/10*

U.S. Cl. 260—16 **10 Claims**

1. A curable moulding composition comprising 20–50% by weight of an unsaturated polyester of an α,β-unsaturated dicarboxylic acid and a polyol; 40–60% by weight of a copolymerizable vinyl monomer; a polymerization inhibitor; a pigment; a polymerization initiator; 5–30% by weight of an acid cellulose ester selected from the group consisting of acid cellulose acetobutyrate and acid cellulose acetopropionate, each said acid cellulose containing carboxylic acid groups, and 1–15% by weight of polystyrene, said percentages by weight being based on the total weight of the composition minus the weight of said pigment.

3,878,138

ANHYDROUS PRODUCTS HAVING IMPROVED WETTABILITY CHARACTERISTICS

James J. Keegan, Bloomfield; Girish Patel, Mine Hill, and Howard Rubin, Rockaway, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Oct. 30, 1972, Ser. No. 302,162

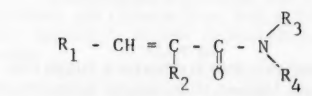
Int. Cl. C08b *21/32;* **C08f** *37/16*

U.S. Cl. 260—17 R **10 Claims**

1. A denture adhesive powder having superior wettability characteristics consisting essentially of a substantially anhydrous mixture of nontoxic, adhesive ingredients and from about 40 percent to about 60 percent by weight, based on the total weight of the denture adhesive ingredients of a powdered polymeric material having an average particle size of less than about 422 microns, said polymeric material being selected from the group consisting of powdered polyethylene having an average molecular weight ranging from about 1000 to 3500 and powdered polypropylene having an average molecular weight ranging from about 120,000 to 350,000; said denture adhesive ingredients comprising a substantially anhydrous mixture of:

A. from about 5 percent to about 55 percent by weight, based on the total weight of the denture adhesive ingredients of at least one cationic polymeric material selected from the group consisting of

1. a copolymer of an acrylamide having the formula:



(I)

wherein R_1 is methyl or hydrogen; and R_2, R_3, and R_4 are each hydrogen or 1 to 7 carbon lower alkyl, with a vinyl quaternary ammonium salt selected from the group consisting of trialkylaminoalkyl acrylate salts, trialkylaminoalkyl methacrylate salts, and vinyloxyalkyltrialkylammonium salts, wherein the alkyl group contains from 1 to 7 carbon atoms; and

2. a copolymer of an acrylamide having the formula I. above with a vinyl or alkyl-substituted vinyl pyridinium salt, wherein the alkyl group is 1 to 7 carbon lower alkyl; and

B. from about 5 percent to about 55 percent by weight, based on the total weight of the denture adhesive, of at least one anionic gum selected from the group consisting of carboxymethylcellulose gum and cellulose sulfate gum.

3,878,139

ACRYLATE AND STYRENE GRAFT COPOLYMERS OF MERCAPTO-GROUP-CONTAINING CELLULOSE DERIVATIVES AND COATING COMPOSITION CONTAINING SAME

Mitsura Takahashi, Osaka; Uraji Narushima, Yokohama, and Yukio Omori, Kobe, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Filed Jan. 26, 1973, Ser. No. 326,694

Claims priority, application Japan, Jan. 31, 1972, 47-11239

Int. Cl. C08b *15/00*

U.S. Cl. 260—17 A **23 Claims**

1. A resin prepared by reacting a mercapto group-containing cellulose derivative with one or more polymerizable monomers selected from the group consisting of esters of acrylic acid and methacrylic acid with alkanols having an alkyl group of 1 – 15 carbon atoms, styrene, vinyltoluene, p - t - butylstyrene, α - methylstyrene, 2 - hydroxyethyl acrylate, 2-hydroxypropyl acrylate, 2 - hydroxyethyl methacrylate, 2 - hydroxylpropyl methacrylate, propylene glycol monomethac-

rylate, 1-methyl-2-hydroxyethyl acrylate, 1-methyl-2-hydroxyethyl methacrylate, glycerol monomethacrylate, glycidyl acrylate, glycidyl methacrylate, acrylonitrile, methacrylonitrile acrylic acid, methacrylic acid, crotonic acid, itaconic acid, fumaric acid and malcic acid in a weight ratio of the mercapto group — containing cellulose derivative to the polymerizable monomer of from 3:97 to 60:40, said mercapto group — containing cellulose derivative being obtained by the reaction between a cellulose derivative selected from the group consisting of nitrocellulose, cellulose acetate, cellulose acetate propionate, cellulose acetate butyrate, methylcellulose, ethylcellulose, benzylcellulose, hydroxyalkylcellulose and carboxymethylcellulose and a mercaptocarboxylic acid selected from the group consisting of thioglycollic acid, mercaptopropionic acid, thiomalic acid and thiosalicylic acid, such that the mercapto group-containing cellulose derivative contains 5×10^{-4} to 5×10^{-3} g. equivalent of SH/gram.

3,878,140

ACRYLIC COATING COMPOSITION FOR REFINISHING FLEXIBLE SUBSTRATES

Ronald J. Sheppard, Flushing, Mich., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 285,094, July 30, 1972, Pat. No. 3,829,397. This application July 9, 1974, Ser. No. 486,897

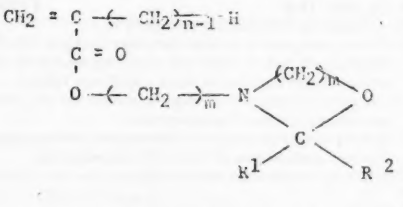
Int. Cl. C08b *21/08;* **C08f** *37/18, 37/06, 45/38*

U.S. Cl. 260—17 R **4 Claims**

1. A coating composition which comprises 40 to 60 percent by volume, based on the total volume of the coating composition, of Composition I and correspondingly 60 to 40 percent by volume of Composition II;

wherein Composition I consists essentially of 10–50 percent by weight of film-forming binder and correspondingly 90–50 percent by weight of an organic solvent for the binder wherein the binder consists essentially of

1. 35–65 percent by weight, based on the weight of the binder, of a copolymer consisting essentially of the reaction product of 80–90 percent by weight of methyl methacrylate and correspondingly 10–20 percent by weight of an alkyl acrylate or an alkyl methacrylate having 2–12 carbon atoms in the alkyl groups;
2. 5–20 percent by weight, based on the weight of the binder, of a copolymer consisting essentially of the reaction product of 85–98 percent by weight of methyl methacrylate and 2–15 percent by weight of polymerized adhesion promoting monomer of the formula



wherein n is 1–2, m is 2–3 and R^1 and R^2 are selected from the group consisting of hydrogen, phenyl, benzyl, an alkyl group having 1–12 carbon atoms, or in combination are 2,2-spirocyclohexyl; and

3. 30–50 percent by weight, based on the weight of the binder, of an organic plasticizer of a phthalate ester or an alkyd resin;

and wherein Composition II comprises a pigmented coating composition containing 0.1–20 percent by weight pigment and 10–50 percent by weight of a film forming binder which consists essentially of

1. 40–75 percent by weight, based on the weight of the binder, of polymethyl methacrylate or a copolymer of methyl methacrylate and diethyl aminoethyl methacrylate or a mixture of polymethyl methacrylate and a copolymer of methyl methacrylate and diethyl aminoethyl methacrylate;
2. 10–30 percent by weight, based on the weight of the binder, of cellulose acetate butyrate having a 0.1–20 second viscosity and a butyryl content of about 30–55 percent by weight; and
3. 15–30 percent by weight, based on the weight of the binder, of an organic plasticizer of a phthalate ester or an alkyd resin.

3,878,141

WELLBORE FLUID LOSS ADDITIVE COMPOSITION

Jack M. Jackson, and Arlynn H. Hartfiel, both of Houston, Tex., assignors to Chemical Additives Company, Houston, Tex.

Division of Ser. No. 228,862, Feb. 24, 1972, Pat. No. 3,785,438. This application Oct. 12, 1973, Ser. No. 405,883The portion of the term of this patent subsequent to Jan. 15, 1991, has been disclaimed.

Int. Cl. C08b *21/32*

U.S. Cl. 260—17 R **1 Claim**

1. A non-argillaceous fluid loss composition consisting essentially of a major amount of low density chemically inert bridging particles of a solid hydrocarbon thermoplastic resin, said bridging particles being non-deformable, having a high softening point well above bottom hole temperatures, consisting essentially of particles larger than 50 microns up to 840.0 microns and being both insoluble in a circulating fluid and soluble in oil and gas condensates; and a minor amount of hydroxyethyl cellulose fluid loss additive adapted to form colloidal particles in a circulating fluid.

3,878,142

COMPOSITIONS FOR LINING CASTING MOULDS AND RELATED ARTICLES AND METHOD OF MAKING SUCH ARTICLES

Julianna Tisza, Mailand, Italy, assignor to Fiema Tidd Chemischtechnische Produkte G.m.b.H., Vienna, Austria

Filed Dec. 4, 1972, Ser. No. 311,868

Claims priority, application Austria, Dec. 3, 1971, 10442/71

Int. Cl. C08g *51/18*

U.S. Cl. 260—17.2 **8 Claims**

1. A lining for metallurgical purposes comprising

60 – 90 wt. % of aluminum waste metal,

1 – 19 wt. % of fibrous filler,

1 – 10 wt. % of binding agent, wherein the binding agent is selected from the group consisting of phenoplasts and aminoplasts,

0.01 – 1 wt. % of wetting agent, wherein the wetting agent is selected from the anion-active compounds and non-ionic compounds and mixtures thereof,

0 – 22.5 wt. % additional constituents selected from the group consisting of exothermic materials, insulating materials, lightweight fillers.

3,878,143
METHOD OF PREVENTING CORROSION IN CONNECTION WITH EXTRUSION OF MIXTURES CONTAINING POLYVINYL CHLORIDE AND WOOD FLOUR OR SIMILAR CELLULOSIC MATERIAL, AND ANALOGOUS MIXTURES CONTAINING POLYSTYRENE OR ACRYLONITRILE-BUTADIENE-STYRENE RESIN, RESPECTIVELY

Hans Baumann, Astorp; Agu Kriisa, and Hans Erik Grahn, both of Malmo, all of Sweden, assignors to Sonesson Plast AB, Malmo, Sweden

Filed Oct. 31, 1973, Ser. No. 411,509

Claims priority, application Sweden, Nov. 3, 1972, 14242/72

Int. Cl. C08f *45/18*

U.S. Cl. 260—17.4 R **7 Claims**

1. A method of preventing corrosion and wear caused by corrosion in connection with extrusion of a mixture comprising a member selected from the group consisting of polyvinyl chloride, polystyrene and acrylonitrile-butadiene-styrene resins and particulate cellulosic material which comprises effecting the extrusion in the presence of at least one gaseous alkaline compound, in order to neutralize acidic gaseous matter originating from the cellulosic material.

3,878,144
METHOD FOR PREPARING CELLULOSE GRAFT COPOLYMERS UTILIZING TERVALENT IRON INITIATOR

Vladimir Ivanovich Samoilov, ulitsa Pervomaiskaya, 17-A, kv. 31, Mytischi, Moskovskoi oblasti; Rem Markovich Livshits, Samarkandsky bulvar, 13, Korpus 4, kv. 40, Moscow; Boris Pavlovich Morin, Kooperativnaya ulitsa, 4, kv. 22, Krasnogorsk, and Zakhar Alexandrovich Rogovin, Donskaya ulitsa, 24, kv. 68, Moscow, all of U.S.S.R.

Filed May 21, 1974, Ser. No. 472,202

Int. Cl. C08g *45/18*

U.S. Cl. 260—17.4 GC **4 Claims**

1. A method for preparing graft copolymers of cellulose consisting in that cellulose derivatives containing functional units selected from the group consisting of dithiocarboxylic and aldehyde functional units, are copolymerized with at least one vinyl monomer in an aqueous medium at pH from 1 to 4, the reaction of copolymerization being initiated by oxidizing the said functional units of cellulose with water-soluble salts of tervalent iron; the degree of substitution in the starting cellulose derivative being 5–25 aldehyde or dithiocarboxylic groups per 100 unit cells of cellulose.

3,878,145
PROCESS FOR PRODUCING WATER-DILUTABLE COATING COMPOSITIONS SUITABLE FOR ELECTROCOATING

Rolf Guldenpfennig, Bammental, Germany, assignor to Reichhold-Albert-Chemie Aktiengesellschaft, Hamburg, Germany

Continuation-in-part of Ser. No. 182,237, Sept. 20, 1971, abandoned, which is a continuation-in-part of Ser. No. 41,684, May 25, 1970, abandoned, which is a continuation of Ser. No. 532,867, March 9, 1966, abandoned. This application May 7, 1973, Ser. No. 358,117

Claims priority, application Germany, Mar. 13, 1965, 1595227

Int. Cl. C08g *30/04, 30/12, 33/18*

U.S. Cl. 260—18 EP **8 Claims**

1. A method for producing water-dilutable coating compositions suitable for electrocoating which comprises partially esterifying glycidylethers based on 2,2-bis(4-hydroxyphenyl) propane containing epoxy groups or hydroxyl groups produced by hydrolytic cleavage of said epoxy groups with at least one monocarboxylic acid, in the ratio of about 1:1 of carboxyl groups to epoxy groups, at a temperature of about 180° to 230°C, further esterifying said partial esters with polybasic carboxylic acids and neutralizing the product with strong nitrogen bases in the presence of water, the improvement comprising preparing said polybasic carboxylic acids without anhydride groups by:

a. forming an adduct of a compound selected from the group consisting of maleic acid or maleic anhydride with a fatty acid selected from the group consisting of saponified natural drying oil, saponified natural semi-drying oil, tall oil fatty acids or dehydrated castor oil fatty acids wherein the reaction between said maleic acid or maleic anhydride with said fatty acid is continued to an unreacted maleic acid or maleic anhydride concentration lower than 2 percent and the molar ratio of said fatty acid to said maleic acid or maleic anhydride is between 0.9:1 and 1.1:1; and

b. hydrolyzing said adduct to form said polybasic acids without anhydride groups.

3,878,146
CURED EPOXY RESIN COMPOSITIONS USEFUL IN THE PROTECTION OF ELECTRICAL CABLES

John R. Charlton, Agincourt, Ontario, Canada, assignor to Hexcel Corporation, Dublin, Calif.

Filed June 4, 1973, Ser. No. 367,041

Int. Cl. C08g *30/14*

U.S. Cl. 260—18 PN **10 Claims**

1. A cured flexible epoxy resin composition useful in the protection of electrical cables subject to flooding comprising: an amine cured epoxy resin derived from an epoxy resin having a viscosity between about 1.2–250 poises (ASTM D445) and an epoxide equivalent of about 150–198 (ASTM A16552), wherein said amine is linseed oil diamine or a long chain, amine terminated polyamide resin obtained by the treatment of dimerized linoleic acid with a polyamine;

an oxidized vegetable oil having an iodine value of less than about 170;

a phthalate plasticizer for said epoxy resin in from 10–200 phr based on said epoxy resin; and

from 10–200 phr of cyclohexanol, benzyl alcohol or phenyl ethyl alcohol.

3,878,147
COMPOSITION FOR INCREASING THE FRICTION OF SURFACES ON ICE

James M. Craven, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 27, 1973, Ser. No. 428,722

Int. Cl. C09k *3/14*

U.S. Cl. 260—18 R **4 Claims**

1. A composition consisting essentially of

5–25% by weight of a soluble elastomer having a Shore A Hardness of 30A to 80D and consisting essentially of a styrene-butadiene-styrene block copolymer rubber;

43–92.99% by weight of an organic solvent for the elastomer having a high evaporation rate;

2–20% by weight of dispersed diatomaceous earth particles having a particle size of 0.2 to 105 microns; and

0.01–2% by weight of an antisettling agent for said particles.

3,878,148
FILM-FARMING COMPOSITIONS COMPRISING AUTOXIDIZABLE MATERIAL

John Gillan, Noble Park, Victoria, and Livia Polgar, Caulfield, Victoria, both of Australia, assignors to Delux Australia Ltd., Melbourne, Victoria, Australia

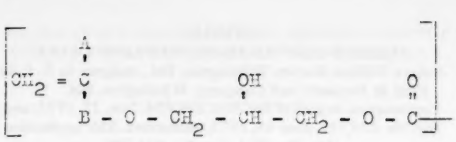
Filed Sept. 20, 1973, Ser. No. 399,274

Claims priority, application Australia, Sept. 28, 1972, 636/72

Int. Cl. C09d *3/66*

U.S. Cl. 260—22 EP **6 Claims**

1. A film-forming composition comprising autoxidizable esterification residues of unsaturated fatty acids and at least one moiety per molecule with a structure of the form:



where A is H or CH_3
and B is - CH_2 - or

3,878,149

STABILIZED POLYOLEFIN IN MOLDING MATERIALS

Roman Fischer, Mutterstadt; Gernot Teege, Ludwigshafen; Werner Fliege, Otterstadt, and Wolfgang Koernig, Mannheim, all of Germany, assignors to Basf Aktiengesellschaft, Ludwigshafen/Rhine, Germany

Filed Feb. 19, 1974, Ser. No. 443,823

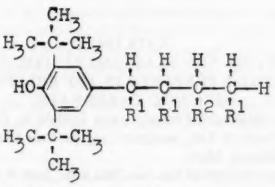
Claims priority, application Germany, Feb. 24, 1973, 2309431

Int. Cl. C08f *45/60, 45/58*

U.S. Cl. 260—23 H **3 Claims**

1. A stabilized polyolefin molding material comprising:

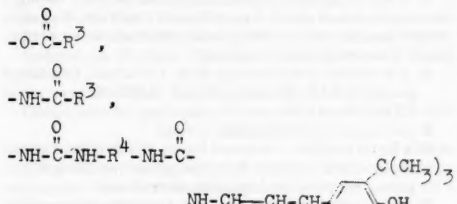
1. a polyolefin; and
2. from 0.05 to 3% by weight based on the polyolefin of a stabilizer



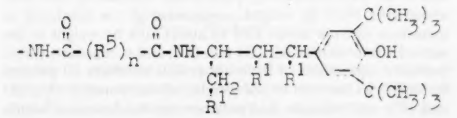
in which

R^1 identical or different is hydrogen or C_1 to C_4-alkyl;

R^2 is



or



where R^3 is a C_1 to C_{18} hydrocarbon radical;

R^4 is a C_1 to C_{18} hydrocarbon radical;

R^5 is a C_1 to C_{18} hydrocarbon radical; and

n is zero or 1.

3,878,150

STABILIZED POLYBUTADIENE RESINS

Delmar F. Lohr, Jr., and Edward Leo Kay, both of Akron, Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Apr. 16, 1973, Ser. No. 351,689

Int. Cl. C08c *11/72;* **C08d** *9/14*

U.S. Cl. 260—23.7 R **15 Claims**

1. Process of producing a resin having a high resistance to thermo-oxidatise deterioration of its mechanical properties, which comprises subjecting to curing temperatures a composition containing

	Parts by Weight
A butadiene polymer or copolymer resin	100
Vinyl triacetoxysilane	0.05–5.0
Silica	100–500
A hydroxyaryl carboxylic acid or salt or ester thereof	0.5–5.0
Calcium stearate	0.5–5.0
Dicumyl peroxide	0.5–6.0

the resin being a homopolymer of butadiene or a copolymer of butadiene and styrene and containing at least 40% by weight of butadiene, and at least 80% of butadiene repeating units in the homopolymer or copolymer being in the 1,2-configuration.

3,878,151

THICKENERS FOR PRINT PASTES COMPOSED OF CROSS-LINKED MALEIC ANHYDRIDE-ALKYL VINYL ETHER POLYMERS

Karl Dachs, Frankenthal; Karl Herrle, Ludwigshafen; Werner Scheuermann, Ludwigshafen, and Adolf Blum, Ludwigshafen, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen/Rheinland, Rheinland-Pfalz, Germany

Continuation-in-part of Ser. No. 828,352, May 27, 1969, abandoned. This application Oct. 30, 1972, Ser. No. 302,134

Claims priority, application Germany, May 28, 1968, 1769466

Int. Cl. C08f *45/44*

U.S. Cl. 260—29.6 T **8 Claims**

1. A print paste for printing fibers and textile material, said print paste consisting essentially of (1) a dye selected from the group consisting of vat dyes, substantive dyes, disperse dyes, metal complex dyes, and pigment dyes, (2) water and (3) from 0.1 to 7% by weight, with reference to the total weight of the print paste of solids from a thickener which has been obtained by:

a. crosslinking a copolymer of 10 to 70 mole% of maleic anhydride, 20 to 70 mole% of an alkyl vinyl ether having 1 to 4 carbon atoms in the alkyl group and 0 to 40 mole% of one or more comonomers selected from the group consisting of vinyl chloride, styrene, ethylene, propylene, acrylamide, methacrylamide, esters of acrylic acid and methacrylic acid with alcohols containing 1 to 4 carbon atoms and the acetic and propionic esters of vinyl alcohol, said percentages being with reference to all the monomers, in an inert water-immiscible organic diluent with from 0.2 to 5% by weight, with reference to the solids content of the copolymer, of a crosslinking agent selected from the group consisting of ethyleneidamine, diethylenetetramine, hexamethylenediamine, monoethanolamine, diethanolamine, triethanolamine, propanolamine, glycol, butanediol and glycerol, said crosslinking

being effected by adding the crosslinking agent to the copolymer, and

b. neutralizing said crosslinked copolymer by adding an aqueous solution of ammonia or sodium hydroxide or by passing in ammonia gas.

3,878,152

HEAT-SENSITIZATION OF ANIONIC AND NON-IONIC AQUEOUS POLYMER DISPERSIONS

Dieter Distler, Mutterstadt; Kurt Wendel, Ludwigshafen; Andreas Einwiller, Mannheim, and Knut Oppenlaender, Ludwigshafen, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen/Rhineland, Rhineland-Pfalz, Germany

Filed May 23, 1973, Ser. No. 362,901

Int. Cl. C08c *1/14;* **C08d** *7/16;* **C08f** *1/92*

U.S. Cl. 260—29.6 XA **9 Claims**

1. In a process for the heat-sensitization of an anionic or nonionic aqueous polymer dispersion having a polymer content of from 5 to 60 percent by weight and containing 0.1 to 2 percent by weight, based on the polymer, of an anionic or nonionic emulsifier, in which a polyalkylene oxide compound having inverse solubility is added, as a sensitizer, to the polymer dispersion after its manufacture, the improvement which comprises adding to said polymer dispersion, as the heat sensitizer therefor, in an amount of from 2 to 10 percent by weight, based on the polymer, a polyalkoxylated aliphatic amine containing from 1 to 10 amino groups and alkoxylated with an alkylene oxide selected from the group consisting of ethylene oxide, propylene oxide, and both oxides, said polyalkoxylated amine having a mean molecular weight of from 200 to 15,000, as measured by the hydroxyl number determined by the acetic anhydride method, and adjusting the pH of the mixture to below 6 if it is not already below 6.

3,878,153

PROCESS OF MIXING TWO ELASTOMERS

Richard E. Driscoll, Monroe, La., assignor to Cities Service Company, New York, N.Y.

Filed Nov. 26, 1971, Ser. No. 202,588

Int. Cl. C08d *7/00, 9/08*

U.S. Cl. 260—29.7 D **10 Claims**

1. In a process for producing a homogenous blend of elastomers by mixing an elastomer in latex form with an elastomer dissolved in a water immiscible organic solvent to form a pseudoemulsion in which the two elastomers are mixed in the liquid phase and both of the mixed elastomers are then coagulated and agglutinated to provide a blend of the two elastomers, the improved method which comprises the following steps:

a. mixing a latex coagulating agent into the aqueous phase of said pseudoemulsion and partially coagulating the elastomer of the latex prior to substantial vaporization of said solvent and hence prior to coagulation of the dissolved elastomer,

b. introducing the pseudoemulsion following step (a) into a hot water bath which contains a latex coagulating agent, vaporizing said organic solvent, coagulating the dissolved elastomer and also the elastomer of the latex which remains uncoagulated following step (a), the dissolved elastomer being coagulated in the presence of coagulated latex elastomer produced during step (a), and thus agglutinating the two elastomers.

3,878,154

MASTICS DERIVED FROM NEOPRENE LATEX

Robert William Keown, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. Nos. 308,854, Nov. 22, 1972, and Ser. No. 370,712, June 18, 1973, abandoned. This application Oct. 30, 1973, Ser. No. 411,299

Int. Cl. C08d *5/02, 7/18;* **C08f** *47/16*

U.S. Cl. 260—29.7 N **10 Claims**

1. In a process for producing a mastic adhesive the step comprising mixing a directly prepared aqueous emulsion of neoprene containing 50–65 percent by weight solids with an organic water-immiscible neoprene solvent containing dissolved adhesion-promoting resin in the presence of a cationic or amphoteric surfactant until the mixture has increased in viscosity to the mastic range and a water-in-oil type dispersion is obtained

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3,878,155

DIEPOXIDES OF 1,2-DIHYDROPHTHALATE

Steven A. Cerefice, Naperville, Ill., and Ellis K. Fields, River Forest, Ill., assignors to Standard Oil Company, Chicago, Ill.

Filed Nov. 23, 1973, Ser. No. 418,371

Int. Cl. C08f *45/32*

U.S. Cl. 260—30.4 R **5 Claims**

1. A composition comprising a resinous polymer of vinyl chloride containing at least 50 mol percent vinyl chloride units and a plasticizing concentration of a 1,2-dihydro-3,4:5,6-dioxyphthalate diester wherein the ester groups are selected from the class consisting of alkyl groups containing from 1 to 24 carbon atoms, aryl groups containing from 6 to 24 carbon atoms, aralkyl groups containing from 7 to 24 carbon atoms, vic-epoxyalkyl groups containing from 2 to 24 carbon atoms and mixtures thereof.

3,878,156

RAPID-SETTING NON-ELASTOMERIC POLYURETHANE COMPOSITIONS PREPARED IN THE PRESENCE OF AN ORGANIC CARBONATE

Franciszek Olstowski, Freeport, and Donald B. Parrish, Lake Jackson, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 366,835, June 4, 1973, which is a continuation-in-part of Ser. No. 179,149, Sept. 9, 1971, abandoned. This application Dec. 17, 1973, Ser. No. 425,399

Int. Cl. C08g *22/04*

U.S. Cl. 260—30.4 N **29 Claims**

1. A non-elastomeric, non-cellular, solid polymer having a density of at least about 1 gram/cc and a percent elongation of less than about 80 resulting from admixture of the components of a composition comprising:

A. a polyether polyol having from 3 to about 8 hydroxyl groups and a hydroxyl equivalent weight between about 75 and about 230,

B. an organic polyisocyanate,

C. a liquid modifier compound having a boiling point above about 150°C selected from the group consisting of organic carbonates and mixtures thereof, and

D. a non-amine-containing catalyst for urethane formation, which is an organo metal compound;

wherein components (A) and (B) are present in amounts so as to provide an NCO:OH ratio of from about 0.8:1 to about 2:1, component (C) is present in quantities of from about 20 to about 50 percent with the proviso that when component (B) is an NCO-containing prepolymer containing less than about 40% NCO by weight, component (C) is employed in quantities of from about 10% to about 50% by weight of the sum of components (A), (B) and (C); and component (D) is present in quantities of from about 0.01 to about 10 percent by weight of the sum of the weights of components (A), (B) and (C); and wherein said polymer can be demolded within

less than about 5 minutes, without the application of an external source of heat, after admixture of said composition.

3,878,157

NON-ELASTOMERIC POLYURETHANE COMPOSITIONS

Franciszek Olstowski, Freeport, and Donald B. Parrish, Lake Jackson, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 179,149, Sept. 9, 1971, abandoned. This application June 4, 1973, Ser. No. 366,835The portion of the term of this patent subsequent to July 17, 1990, has been disclaimed.

Int. Cl. C08g *22/04*

U.S. Cl. 260—33.8 UB 13 Claims

1. A non-elastomeric, non-cellular dense, solid polymer having a density of at least about 1 gram/cc resulting from admixture of the components of a composition comprising:

A. a polyether polyol having from 3 to about 8 hydroxyl groups and a hydroxyl equivalent weight between about 75 and about 230.

B. an organic polyisocyanate,

C. a liquid modifier compound having a boiling point above about 150°C selected from the group consisting of halogenated aliphatic compounds and mixtures thereof, and

D. a non-amine-containing catalyst for urethane formation, which is an organo metal compound;

wherein components (A) and (B) are present in amounts so as to provide an NCO:OH ratio of from about 0.8:1 to about 2:1, component (C) is present in quantities of from about 0.2 to about 50 percent by weight of the sum of components (A), (B) and (C); and component (D) is present in quantities of from about 0.01 to about 10 percent by weight of the sum of the weights of components (A), (B) and (C); with the proviso that when the halogenated aliphatic compound also contains hydroxyl groups and has an OH equivalent weight of less than about 500 it is employed in quantities of from about 0.2 to about 5 percent by weight based upon the sum of the weights of A, B and C; and wherein said polymer can be demolded within less than about 5 minutes, without the application of an external source of heat, after admixture of said composition.

3,878,158

PROCESS FOR THE COLOURATING IN BULK OF SYNTHETIC POLYAMIDES

Claude Marie Henri Emile Brouard, Sotteville Les Rouen, and Paulette Gisele Ficht, Mont Saint Aignan, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

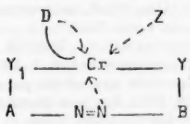
Filed Feb. 25, 1974, Ser. No. 445,184

Claims priority, application France, Mar. 2, 1973, 73.07457

Int. Cl. C08g *51/14*

U.S. Cl. 260—37 N 8 Claims

1. Process for the dyeing in bulk of fibres based on synthetic polyamides in which the dyeing is effected by means of a monoazo chromiferous complex dyestuff of the formula:



(I)

wherein A represents the residue of a diazotisable amine, B represents the residue of a coupling compound, the residues A or B carrying a sulphonic group, Y_1 represents —O— or

Y_2 represents —O— or

D represents the residue of a bidentate chelating agent, Y_1 and Y_2 are respectively in a vincinal position with respect to the group —N=N—, and Z represents a monofunctional neutral ligand.

3,878,159

FOUNDRY BINDERS ON THE BASIS OF PHENOLIC RESINS

Silvio Vargiu, and Silvestro Pezzoli, both of Milan, Italy, assignors to Societa Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed June 12, 1973, Ser. No. 369,346

Claims priority, application Italy, June 13, 1972, 25581/72

Int. Cl. C08g *51/04*

U.S. Cl. 260—38 6 Claims

1. Foundry binders on the basis of phenolic resins, comprising

a. a novolak prepared by condensation of phenol with formaldehyde in a molar ratio of about 1:0.4 to 0.9 in the presence of an acid catalyst and having a fluidity of about 90–110 mm,

b. about 0.05 to about 1.0 wt.% of a silane having the general formula

$$R'Si(OR)_3$$

where R is a methyl or ethyl group and R′ is a residue which is a vinyl group or an alkyl residue substituted with mercapto groups, optionally substituted amino residues, epoxyalkyl residues, or epoxycycloalkyl residues, and

c. about 0.5 to about 8.0 wt.% of the diamide of a long-chain monocarboxylic acid having the general formula

$$(RCO)_2—N(CH_2)_n—NH_2$$

where n is an integer from 2 to 6 and R is an alkyl residue with 11 to 20 carbon atoms in the chain, and

d. about 1.0 to about 6.0 wt.% of an aromatic carboxylic acid.

3,878,160

FRICTION ELEMENT COMPOSITION

Frank S. Grazen; Melvin L. Buike, and Frank M. Bryzinsky, all of North Tonawanda, N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Division of Ser. No. 188,596, Oct. 12, 1971, Pat. No. 3,767,612, which is a continuation of Ser. No. 872,737, Oct. 30, 1969, abandoned. This application Dec. 20, 1972, Ser. No. 317,035

Int. Cl. C08g *37/18*, *51/10*

U.S. Cl. 260—38 5 Claims

1. A friction element composition, comprising a friction imparting abrasive agent, an inorganic filler and a binder composition consisting essentially of a non-hydroxyalkylated hydroxy aromatic hydrocarbon-aldehyde resole containing substantially no etherified aromatic hydroxy groups and at least about 5 percent by weight of a different alkylated hydroxy aromatic hydrocarbon-aldehyde resole, wherein the alkylated groups are substituted on the aromatic ring and are selected from the group consisting of:

a. alkyl groups of 1 to 60 carbon atoms,

b. cycloalkyl groups of 5 to 12 carbon atoms,

c. alkyl, aryl and cycloalkyl ketonic groups wherein the hydrocarbon portion is as defined in (a) and (b),

d. alkyl, aryl and cycloalkyl carboxylic groups wherein the hydrocarbon portion is as defined in (a) and (b),

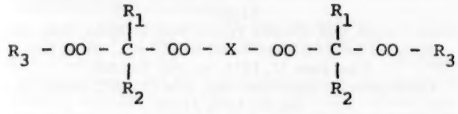
e. aryl groups of 6 to 24 carbon atoms, and
f. aryl substituted alkyl wherein the aryl is phenyl, lower alkyl-substituted phenyl or hydroxy substituted phenyl.

3,878,161
VULCANIZING ELASTOMERS AND CROSSLINKING, PLASTOMERS WITH ORGANIC TETRAPEROXIDES

Egeo Sacrini, and Claudio Cavallotti, both of Milan, Italy, assignors to The B. F. Goodrich Company, Akron, Ohio

Division of Ser. No. 62,128, Aug. 8, 1970, Pat. No. 3,775,465. This application June 27, 1973, Ser. No. 374,268
Claims priority, application Italy, Aug. 12, 1969, 20839/69
Int. Cl. C07c *73/00;* **C08f** *47/00, 45/08*
U.S. Cl. 260—42.42 **11 Claims**

1. A vulcanizable composition comprising an elastomer and a tetraperoxide of the formula



wherein each R_1 is hydrogen or an alkyl, haloalkyl, cycloalkyl, halocycloalkyl or alkylcycloalkyl group having 1–15 carbon atoms; aryl, haloaryl or alkaryl group having 6–15 carbon atoms; oxyalkyl, oxyalkylaryl or oxycycloalkyl groups having 1–15 carbon atoms; each R_2 is a carbalkoxy alkylene group wherein each alkylene group and each alkoxy group have 1–4 carbon atoms; each R_3 is an alkyl or haloalkyl group having 4-12 carbon atoms; cycloalkyl, halocycloalkyl or alkylcycloalkyl group having 4–21 carbon atoms; aryl, alkaryl or haloaryl groups having 6–24 carbon atoms; oxyalkyl, oxyalkylaryl or oxycycloalkyl groups having 4–24 carbon atoms; or an acyl group having 6–12 carbon atoms; and *X* is an alkylene, haloalkylene or arylalkylene group having 2–18 carbon atoms; an alkenylene, haloalkenylene or arylalkenylene group having 2–18 carbon atoms; an alkinylene, haloalkinylene or arylalkinylene group having 2–18 carbon atoms; an oxyalkylene group having 2–18 carbon atoms; or an arylene, alkylarylene or haloarylene group having 6–18 carbon atoms.

3,878,162
FLAME-RETARDANT FINISHING OF THERMOPLASTS

Siegfried Breitschaft, Augsburg, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt/Main, Germany

Filed July 30, 1973, Ser. No. 383,783
Claims priority, application Germany, Aug. 2, 1972, 2237875
Int. Cl. C08d *11/04*
U.S. Cl. 260—45.7 P **4 Claims**

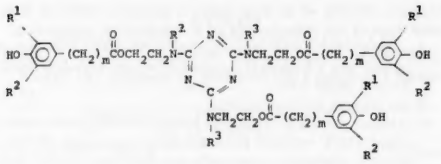
1. Process for applying red phosphorus to granules of inflammable thermoplasts to give them a flame-retardant finishing, which comprises intensely mixing the granules in an atmosphere of an inert gas with 0.5 to 45% of their weight of finely pulverized red phosphorus and 2 to 15% by weight, calculated on the phosphorus, of a mono-, di-, triester of orthophosphoric acid liquid at the processing temperature of from 10° to 160°C having at this temperature a viscosity not exceeding 1,000 cps and having the formulae H_2RPO_4, HR_2PO_4 and R_3PO_4 in which R represents the radical of a straight chain or branched aliphatic alcohol having from 2 to 18 carbon atoms, the radical of a phenol carrying at most three alkyl side chains having from 1 to 9 carbon atoms, or the radical of an alcohol obtained by reacting the alcohols or phenols from which the aforesaid radicals re derived with 1 to 8 moles of ethylene oxide, until the total amount of phosphorus used forms a firm coating on the granules, the red phosphorus and the phosphoric acid ester or ester mixture being applied to the granules one after the other in any order of succession.

3,878,163
3,5-DIALKYL-4-HYDROXYPHENYL ALKANOIC ACID ESTERS OF 2,4,6-TRIS(ALKANOLAMINO) DERIVATIVES OF TRIAZINE AS ANTIOXIDANTS

Martin Dexter, 416 Cedar Dr., Briarcliff Manor, N.Y. 10510, and David Herbert Steinberg, 2608 Davidson Ave., Bronx, N.Y. 10468

Division of Ser. No. 159,022, July 1, 1971, Pat. No. 3,709,884. This application Oct. 26, 1972, Ser. No. 301,037
Int. Cl. C07d *55/50;* **C08f** *45/60*
U.S. Cl. 260—45.8 NT **10 Claims**

1. A composition of matter stabilized against oxidative deterioration which comprises an organic material normally subject to oxidative deterioration containing from 0.005 to 5% by weight of a stabilizing compound of the formula



wherein each of
R^1 and R^2 is a (lower)alkyl group of from 1 to 4 carbon atoms;
R^3 is an alkyl of from 1 to 8 carbon atoms or hydrogen, and
m is 1 or 2.

3,878,164
TETRAFLUOROETHYLENE POLYMER COMPOSITIONS

Alfred Robert Lott, Welwyn Garden City, England, assignor to Imperial Chemical Industries Limited, London, England

Filed June 29, 1972, Ser. No. 267,653
Claims priority, application United Kingdom, July 2, 1971, 31119/71; July 2, 1971, 31120/71
Int. Cl. B01j *1/10*
U.S. Cl. 260—42.27 **9 Claims**

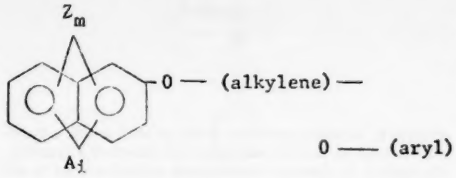
1. A method for the production of a coagulated dispersion grade of a tetrafluoroethylene polymer suitable for paste extrusion wherein a coagulated dispersion paste extrusion grade of a tetrafluoroethylene polymer is subjected in powder form to ionising radiation until it has received a dose of irradiation with the range 0.01 to 1.0 Mrad.

3,878,165
POLYOLEFIN PLASTIC COMPOSITIONS CONTAINING BIS-ARYLOXY FLAME RETARDANTS

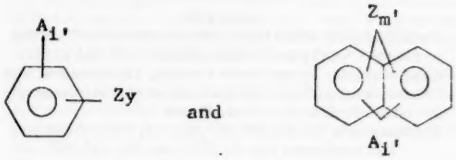
Arnold L. Anderson, Alma, Mich., assignor to Michigan Chemical Corporation, St. Louis, Mich.

Continuation-in-part of Ser. No. 260,240, June 6, 1972, abandoned. This application Feb. 8, 1973, Ser. No. 330,825The portion of the term of this patent subsequent to Aug. 20, 1991, has been disclaimed.
Int. Cl. C08g *51/60*
U.S. Cl. 260—45.9 R **18 Claims**

1. A plastic composition containing polyolefin having incorporated therein a flame retardant which is a bis-aryloxy compound having the formula:



wherein aryl is from the group



Z is selected from the group consisting of bromine or chlorine; m and m' are integers having a value of 1–7; y is an integer having a value of 1–5; i and i' are integers having a value of 0–2; A is selected from the group consisting of cyano, nitro, lower alkoxy, lower alkyl, fluorine, dialkylamino, phenyl, halophenyl, benzyl or halo- benzyl; and alkylene is a straight or branched chain alkylene group having from one to six carbon atoms.

3,878,166

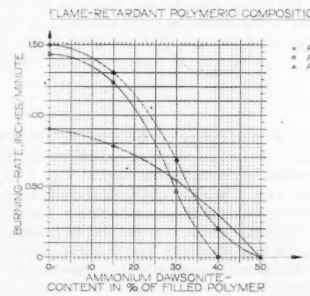
FLAME RETARDANT POLYMERIC COMPOSITIONS

Elias A. Woycheshin, Livermore; Ronald J. Rigge, Pleasanton, and Igor Sobolev, Orinda, all of Calif., assignors to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Filed Feb. 11, 1974, Ser. No. 441,486

Int. Cl. C08f *45/60*

U.S. Cl. 260—45.9 R **8 Claims**



1. A polymeric compound of significantly reduced burning rate, as measured by the Underwriters' Laboratories (UL) 94 Horizontal Burning Rate Test, comprising a polymer selected from the group consisting essentially of polyvinyl chloride, polyvinyl acetate, polyacrylonitrile, esters of polymethacrylic acid, polypropylene, polystyrene, ABS resin and polyethylene, and characterized by a burning rate in the range from about 0.7 inch/minute to about 2.5 inches/minute, a thermal degradation temperature at or below about 450°C, a processing temperature below about 200°C; and an ammonium dawsonite composition containing at least about 50 percent by weight ammonium dawsonite of the formula $NH_4Al(OH)_2CO_3$, the balance consisting of aluminous starting material, the ammonium dawsonite composition being uniformly distributed in the polymeric compound in an amount from about 15 to about 50 percent by weight of the polymeric compound.

3,878,167

FLAME AND SMOKE RETARDANT VINYL CHLORIDE AND VINYLIDENE CHLORIDE POLYMER COMPOSITIONS

William J. Kroenke, Brecksville, Ohio, assignor to The B. F. Goodrich Company, New York, N.Y.

Filed Feb. 1, 1974, Ser. No. 438,759

Int. Cl. C08f *45/56*

U.S. Cl. 260—45.9 R **5 Claims**

1. A flame and smoke retardant composition comprising (1) a vinyl chloride or vinylidene chloride polymer and (2) Si_3N_4, said Si_3N_4 being present in an amount of from about 0.5 to about 10 weight parts per 100 weight parts of polymer and having an average particle size of from about 100 microns to about 0.5 micron.

3,878,168

NOVEL SILICONE ELASTOMERS

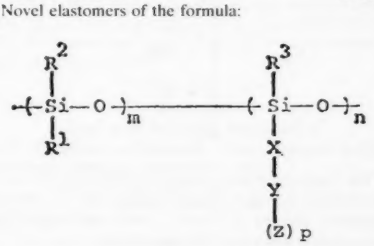
Richard L. Schank, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 30, 1973, Ser. No. 420,751

Int. Cl. C08f *11/04*

U.S. Cl. 260—46.5 E **15 Claims**

1. Novel elastomers of the formula:



wherein R^1, R^2 and R^3 are independently selected from aryl and alkyl of 1 to 10 carbon atoms; X is a polymethylene chain of from 2 to 10 carbon atoms; Y is a group selected from ureido, silylureido, amido, silylamino, thioureido, silylthioureido, urethano alkylideneamino, isocyanoureido, halosilylamino and sulfonamido; Z is a hydrocarbon of from 1 to 50 carbon atoms selected from alkyl, alkaryl, aryl, aralkyl which hydrocarbon can be substituted with one or more groups selected from hydroxy, nitro, halo, sulfonamido and carboxyl; m and n are integers wherein the ratio of m:n is between 20:1 and 1000:1, and p is an integer of from 1 to 3.

3,878,169

PHOTODEGRADABLE POLYESTERS PREPARED FROM KETONIC DICARBOXYLIC ACIDS

James Edwin Guillet, 31 Sagebrush Ln., Don Mills, Ontario, and Ervin Dan, 376 Brunswick Ave., Apt. 502, Toronto 4, Ontario, both of Canada

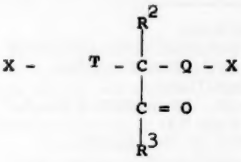
Continuation-in-part of Ser. No. 135,426, April 19, 1971, abandoned. This application Apr. 18, 1972, Ser. No. 245,176

Int. Cl. C08g *15/00, 17/04*

U.S. Cl. 260—63 R **5 Claims**

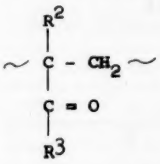
1. A condensation copolymer obtained by reacting together at least one dibasic acid of formula HOOC — R^1 — COOH or a functional derivative thereof selected from the group consisting of acid halides, esters and salts which react in the same way as acids, where R^1 is a divalent hydrocarbon radical selected from the group consisting of aliphatic, alicyclic, aromatic and araliphatic, at least one glycol of formula HO — R^4 — OH where R^4 is an organic radical selected from the group

consisting of aliphatic, alicyclic, aromatic and araliphatic hydrocarbon radicals, or a polyether or polyester glycol or polyol and a monomer of the formula B:



(B)

where T is selected from the group consisting of methylene chains having 0 - 6 carbon atoms, and methylene chains of 2 – 6 carbon atoms interrupted by ester linkages, Q is selected from the group consisting of methylene chains having 1 – 6 carbon atoms and methylene chains of 2 – 6 carbon atoms interrupted by ester linkages, R^2 is hydrogen or an alkyl group of 1 – 6 carbon atoms, R^3 is an alkyl, aryl, alkaryl or alkenyl group of from 1 –12 carbon atoms and X is selected from — OH, — COOH and functional derivatives thereof selected from the group consisting of acid halides, esters and salts which react in the same manner as acids, the monomer of formula B providing a unit of structure



in the backbone of the copolymer, the number of said units in the backbone chain being sufficient to provide from about 0.01 weight percent to about 3 weight percent of ketone carbonyl based upon the total copolymer.

3,878,170

POLYMERS CONTAINING CYCLO-1,1-DIALLYLGUANIDINE LINKAGES AND WET STRENGTH PAPER HAVING A CONTENT THEREOF

Hans Peter Panzer, Stamford, Conn., and Louis Vincent McAdams, East Greenwich, R.I., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 107,456, Jan. 18, 1971, Pat. No. 3,790,537. This application Oct. 1, 1973, Ser. No. 402,435

Int. Cl. C08g *1/18, 3/00, 9/24*

U.S. Cl. 260—64 **6 Claims**

1. A water-soluble cationic polymer consisting essentially of cyclo-1,1-diallylguanidine linkages, said polymer having a sufficient number of glyoxal substituents to be thermosetting.

3,878,171

PROCESS FOR CROSSLINKING HYDROPHILIC COLLOIDS USING UNSATURATED ALDEHYDES CONTAINING N-HETEROCYCLIC RINGS

Rainer Kitzing, Villars sur Glane, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

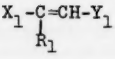
Filed Feb. 26, 1973, Ser. No. 335,604

Claims priority, application Switzerland, Feb. 29, 1972, 2867/72

Int. Cl. C08f *27/18;* **C08h** *1/06;* **C09h** *7/00*

U.S. Cl. 260—73 R **9 Claims**

1. Process for crosslinking a hydrophilic colloid which contains amino, imino and/or hydroxyl groups, which process comprises using a crosslinking agent of the formula



wherein R_1 denotes a hydrogen atom, an alkyl group, a cycloalkyl radical, an aralkyl radical, an aryl radical or a heterocyclic radical, X_1 denotes a heterocyclic radical bonded to the $—CR_1=CH—$ group by means of a tertiary ring nitrogen atom of a five-membered heterocyclic ring containing 2 to 4 nitrogen atoms and 3 to 1 carbon atoms and Y_1 denotes an aldehyde group or a functionally modified aldehyde group.

3,878,172

PROCESS FOR PREPARING HEAT RESISTANT RESIN FROM UNSATURATED BIS-IMIDE AND DIAMINE

Michel Bargain, Lyon; Andre Combet, La Mulatiere, and Pierre Grosjean, Sainte-foy-les-Lyon, all of France, assignors to Rhone-Poulenc S.A., Paris, France

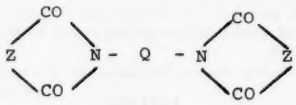
Continuation of Ser. No. 885,956, Dec. 12, 1969, abandoned. This application Feb. 3, 1972, Ser. No. 223,367

Claims priority, application France, Dec. 19, 1968, 68.179314

Int. Cl. C08g *20/20*

U.S. Cl. 260—78 UA **9 Claims**

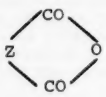
1. In a process for the preparation of a resin by heating to 100°C to 350°C. an unsaturated bis-imide of formula:



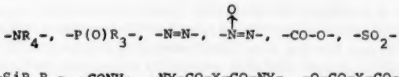
with a diamine of the formula:

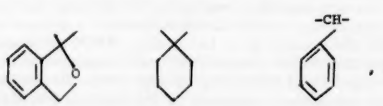
$$H_2N — T — NH_2$$

in a mole ratio from 1.2:1 to 50:1, in which Z represents a divalent radical containing a carbon-carbon double bond derived from an ethylenic anhydride of the formula:

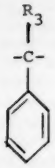


and each of Q and T, which may be the same or different, represents a linear or branched alkylene radical having less than 13 carbon atoms, a cycloalkylene radical with 5 or 6 carbon atoms in the ring, a heterocyclic radical containing at least one of the atoms oxygen, nitrogen and sulphur, a phenylene or polycyclic aromatic radical, or a plurality of phenylene or alicyclic radicals linked directly or by a divalent oxygen or sulphur atom, an alkylene group of 1 to 3 carbon atoms, or one of the groups





, and



in which R_3, R_4 and Y each represent alkyl of 1 to 4 carbon atoms or a cycloalkyl radical having 5 or 6 carbon atoms in the ring or a phenyl or polycyclic aromatic radical, and X represents a straight or branched alkylene radical having less than 13 carbon atoms, a cycloalkylene radical having 5 or 6 carbon atoms in the ring, or a mono or polycyclic arylene radical, the improvement which comprises carrying out the reaction in the presence of from 0.5 to 5 percent by weight based on the weight of the bis-imide of a strong acid having a pK_a of less than 4.5 having no carboxylic acid radical attached directly to a cyclic carbon atom or from 0.01 to 2 percent by weight of the bis-imide of an inhibitor of free radicals.

3,878,173

PROCESS FOR OBTAINING HIGH MOLECULAR WEIGHT POLYAMIDES FROM LACTAMS

M. Michael Biensan, and M. Philippe Potin, both of Billiere, France, assignors to Societe Aquitaine Total Organico, Courbevoie, France

Filed Aug. 16, 1972, Ser. No. 281,226

Claims priority, application France, Aug. 25, 1971, 71.30753

Int. Cl. C08g *20/18*

U.S. Cl. 260—78 L **10 Claims**

1. A process for producing high molecular weight polyamides which comprises anionically polymerizing at least one lactam having at least 4 carbon atoms in the ring in the presence of an alkali catalyst and mixing the resulting polymer with at least one member selected from the group consisting of an arylsulfonic acid, an alkylsulfonic acid, and esters thereof.

3,878,174

ANTISTATIC POLYCARBONAMIDE COMPOSITION

Lloyd T. Jenkins, and Pompelio A. Ucci, both of Pensacola, Fla., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 400,756, Sept. 26, 1973, abandoned. This application May 21, 1974, Ser. No. 471,944

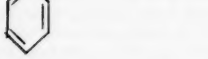
Int. Cl. C08g *20/38*

U.S. Cl. 260—78 S **5 Claims**

1. A polycarbonamide composition suitable for melt spinning into multifilament fusion-free antistatic yarn, consisting essentially of a polycarbonamide having dispersed therein, based on the weight of polycarbonamide,

A. 1 to 20 percent of a polyalkoxylated triglyceride of a saturated fatty acid wherein the polyalkoxy portion thereof has a molecular weight ranging from about 2,200 to about 22,000 and wherein the saturated fatty acid has 10 to 30 carbon atoms, and

B. 0.3 to 2.0 percent of an alkylene bis-alkylcarboxamide of the formula



wherein R is a C_{12} to C_{20} alkyl radical and R' is a C_2 to C_4 alkylene radical.

3,878,175

HIGHLY ABSORBENT SPONGY POLYMER MATERIALS

Robert Steckler, Crofton, Md., assignor to Plastik Devices, Inc., Briarcliff Manor, N.Y.

Filed July 27, 1973, Ser. No. 383,275

Int. Cl. C08f *19/00, 19/10*

U.S. Cl. 260—78.5 BB **12 Claims**

1. The process of preparing a spongy cross-linked copolymer which comprises heating a solution in a hydrophobic liquid diluent of a mixture consisting essentially of from 30 to 90 percent by weight of a heterocyclic N-vinyl monomer containing a carbonyl functionality adjacent to the nitrogen in its heterocyclic moiety, 10 to 70 percent by weight of a comonomer selected from the class of vinyl esters and acrylate esters, 0 to 30 percent by weight of acrylamide or methacrylamide, and from about 0.5 to about 12 percent by weight, based on the total weight of the comonomer mixture of said heterocyclic N-vinyl monomer and said ester of a polyethylene glycol dimethacrylate as cross-linking agent, said heating conducted in the absence of atmospheric oxygen at a temperature ranging from ambient to about 60°C. for a period of time sufficient to yield a slightly gelled mass, followed by continued heating in an inert atmosphere to a temperature of about 100°C. for a period of 1 to 3 hours to yield an opaque self supporting spongy mass.

3,878,176

ARYLENE SULFIDE POLYMERS

Charles W. Moberly, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 19, 1973, Ser. No. 416,817

Int. Cl. C08g *23/00*

U.S. Cl. 260—79.1 **15 Claims**

1. A method of producing polymers comprising:

a. forming a composition by contacting sulfur, at least one polyhalo-substituted aromatic compound in which the halogen atoms are attached to aromatic ring carbon atoms, at least one base selected from the hydroxides of lithium, sodium, potassium, rubidium, cesium, magnesium, calcium, strontium and barium, and at least one organic amide; and,

b. maintaining at least a portion of said composition at polymerization conditions to produce said polymer.

3,878,177

METHOD FOR ACCELERATING LACTONIZATION

Yasuo Matsumura, and Kunio Maruyama, both of Okayama, Japan, assignors to Japan Exlan Company Limited

Filed Dec. 15, 1971, Ser. No. 208,398

Claims priority, application Japan, Dec. 29, 1970, 45-125337

Int. Cl. C08f *27/00;* **C08g** *17/02*

U.S. Cl. 260—79.3 MU **8 Claims**

1. In a method for lactonizing a vinyl copolymer produced from a vinyl monomer containing a nitrile group and at least one monomer selected from the group consisting of monomers containing a hydroxyl group or capable of producing a hydroxyl group by treating said copolymer or fibers or films shaped therefrom with an acid medium having a pH less than 2 so that lactone rings are formed in the copolymer, the improvement wherein a metal component selected from the group consisting of copper, zinc and cadmium, and oxides, halides, halogen acid salts, nitrates, sulfates, phosphates, sulfonates and carboxylates of said metals is added to the acid medium to accelerate the lactonizing reaction in the copoly-

mer, said metal component being added in such amounts that it is present in the acid medium in a concentration of 0.001 mol/liter to 5 mol/liter.

3,878,178

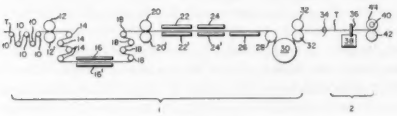
PRODUCT AND PROCESS

Gail Crolley Guinn, Gastonia, N.C., and Joseph W. Jenny, Jr., Camden, S.C., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 89,918, Nov. 16, 1970, abandoned. This application Apr. 26, 1973, Ser. No. 354,792

Int. Cl. C08f *15/40, 47/00*

U.S. Cl. 260—79.3 MU **3 Claims**



1. A tow of acrylic filaments, said acrylic filaments consisting essentially of 93.9% acrylonitrile, 6% methylacrylate and 0.1% sodium styrene sulfonate, the filaments have an X-ray porosity index of 1.27–1.47 in the void size range of 45–90A and 1.18–1.35 in the void size range of 90–140A, a molecular orientation of 68.9–73.8%, a brake elongation of 14.6–15.2%, a shrinkage in boiling water of 14.7–16.6% and a break tenacity of about 4.0 gpd.

3,878,179

POLYMERIZATION OF OLEFINS

John P. Hogan, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 812,850, April 2, 1969, abandoned. This application Jan. 17, 1973, Ser. No. 324,437

Int. Cl. C08f *15/04, 1/42, 1/66*

U.S. Cl. 260—88.2 R **9 Claims**

1. A process for copolymerizing ethylene and butene-1 which comprises contacting ethylene containing a minor proportion of butene-1 under polymerization conditions with a catalyst composition consisting essentially of the hydrocarbon-insoluble reaction product separated from the hydrocarbon-soluble reaction product of an admixture formed by contacting a supported chromium oxide catalyst, a portion of said chromium being in the hexavalent state, with an aluminum hydrocarbyl oxide and a hydrocarbylmetal in the presence of a liquid hydrocarbon, said aluminum hydrocarbyl oxide having the formula $R_xAl(OR)_y$ in which R is a hydrocarbyl group containing from 1 to 14 carbon atoms and x and y are whole integers having a sum equal to 3, and said hydrocarbylmetal including compounds of the formula R_zM in which R is a hydrocarbyl group having from 1 to 14 carbon atoms, M is an amphoteric metal selected from aluminum and zinc and z is an integer equal to the valence of M.

3,878,180

POLYMERIZATION OF ACRYLIC ACID ESTERS

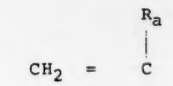
Charles B. Holder, Wappingers Falls; Donald R. Lachowicz, Fishkill; Isaac D. Rubin, Wappingers Falls, and George S. Saines, Fishkill, all of N.Y., assignors to Texaco Inc., New York, N.Y.

Continuation-in-part of Ser. No. 98,175, Dec. 14, 1970, abandoned. This application July 9, 1973, Ser. No. 377,461

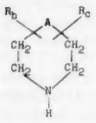
Int. Cl. C08f *3/64, 3/66, 3/68*

U.S. Cl. 260—89.5 A **15 Claims**

1. A method of hompolymerizing a monomer of the formula:



wherein R is alkyl of from 1 to 30 carbon atoms and R_a is selected from the group consisting of hydrogen and alkyl of from 1 to 3 inclusive carbon atoms, which comprises contacting the monomer under non-emulsifying conditions with an initiator of the formula:



wherein R_b and R_c are selected from the group consisting of hydrogen and alkyl of from 1 to 5 carbon atoms, wherein R_b and R_c are each attached to different ring carbon atoms, and A is selected from the group consisting of CH_2, O and NH and wherein the said initiator is present in an amount from about 0.1 to about 10 volume percent based on the volume of the monomer.

3,878,181

EMULSION POLYMERISATION OF CHLOROPRENE WITH DIETHYLHYDROXY-AMINES AS INACTIVATOR

Rudolf Mayer-Mader, Cologne-Buchheim, and Gerhard Hohmann, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 7, 1974, Ser. No. 431,345

Claims priority, application Germany, Jan. 11, 1973, 2301158

Int. Cl. C08d *3/14;* **C08f** *3/20*

U.S. Cl. 260—92.3 **2 Claims**

1. A process for terminating the aqueous emulsion polymerisation of 2,3-dichlorobutadiene which comprises adding to the polymerisation mixture when the monomer conversion reaches 40–80 percent by weight, 0.05 to 5 parts by weight of diethylhydroxylamine per 100 parts by weight of 2,3-dichlorobutadiene and 0.05 to 5 parts by weight of a water-soluble amine, per 100 parts by weight of 2,3-dichlorobutadiene, said water soluble amine being of the formula NR_3 wherein two of the R groups are hydroxyalkyl having 1 to 10 carbon atoms and the third R group is selected from the group consisting of hydroxyl and alkyl having 1 to 10 carbon atoms.

3,878,182

METHOD FOR PREPARING CARBON-CHAIN LINEAR POLYMERS

Vitaly Abramovich Kormer, ulitsa Zheleznovodskaya 62, kv. 2; Tatyana Lvovna Jufa, ulitsa Tipanova 29, kv. 513; Boris Davidovich Babitsky, ulitsa Krasnogo Kursanta, 7, kv. 9; Viktoriya Vladimirovna Markova, ulitsa Bolotnaya 11, kv. 18; Mark Iosifovich Lobach, prospekt Annikova 28, kv. 52; Nikolai Fedorovich Kovalev, prospekt Veternaov 147, kv. 170; Irina Alexandrovna Poletaeva, ulitsa 3 Internatsionala 74, kv. 212; Nadezhda Pavlovna Simanova, ulitsa Kolomenskaya 22, kv. 57; Irina Moiseevna Lapuk, Narvsky prospekt 8, kv. 18, and Galina Vasilievna Kholodnitskaya, 6 Sovetskaya ulitsa 28, kv. 12, all of Leningrad, U.S.S.R.

Filed Mar. 16, 1973, Ser. No. 341,951

Claims priority, application U.S.S.R., Mar. 16, 1972, 1757213

Int. Cl. C08f *1/34, 1/38, 1/40*

U.S. Cl. 260—93.1 **1 Claim**

1. A method for preparing carbon to carbon chain linear homopolymers comprising bulk or solution polymerization of alicyclic compounds containing from 4 to 12 carbon atoms

and from 1 to 4 double bonds in the ring, at a temperature of from −50° to +80°C in the presence of a catalyst consisting essentially of a transition metal compound of the general formula $M_nX_mY_pZ_q$, where M is a transition metal selected from Group V–VIII of the periodic table, with X, Y, and Z being selected from the group consisting of halogen, NO, CO, $P(OR)_3$, PR_3, OR, C_5H_5N, C_5H_5, C_6H_6, C_8H_{12}, and where R is selected from the group consisting of alkyls, and aryls having from 1 to 20 carbon atoms, and halogen, where n is from 1 to 4, m, p and q are from 0 to 8, and an aluminum compound having the formula $(AlH_bU_c)_dfP$, where U is selected from the group consisting of halogens and amines of the formula NR'_2 where R′ is selected from the group consisting of hydrogen, alkyl, and aryl having from 1 to 20 carbon atoms, where P is selected from the group consisting of ether and teriary amine having from 2 to 20 carbon atoms, where b is 1 or 2, c is 3-b, d is from 1 to 50, and f is from 0 to d, the molar ratio of aluminum to the transition metal being from 0.1 to 30:1.

3,878,183

FIBROUS POLYOLEFIN PARTICLES AND PRODUCTION THEREOF

Michio Koga; Masaki Fujii, and Hiroshi Yui, all of Yokkaichi, Japan, assignors to Mitsubishi Petrochemical Company Limited, Tokyo, Japan

Filed Dec. 23, 1971, Ser. No. 211,563

Claims priority, application Japan, Dec. 28, 1970, 45-119635

Int. Cl. C08d *3/04, 7/00*

U.S. Cl. 260—94.9 R **24 Claims**

1. A particulate polyolefin comprising, predominantly, constituent unit particles of fibrous character each being of a length greater than 200 microns and a diameter less than 1,000 microns, the ratio of the length of diameter being greater than 5, minor proportion of the unit particles respectively having cores of fibrous carrier material therein, the content of which within the polyolefin is less than 30 percent by weight.

3,878,184

MONELLIN RECOVERY USING CARBOXYMETHYL CELLULOSE

Reuven Dobry, Stamford, Conn., assignor to Beech-Nut, Inc., New York, N.Y.

Filed Feb. 26, 1973, Ser. No. 335,620

Int. Cl. A23j *1/14;* **A23l** *1/26*

U.S. Cl. 260—112 R **12 Claims**

1. A method for obtaining the sweet tasting principle of *Dioscoreophyllum cumminsii* in useful form adsorbed on carboxymethylcellulose comprising contacting with carboxymethylcellulose free acid the soluble matter obtained by extracting macerated clusters of whole berries of *Dioscoreophyllum cumminsii* with water.

3,878,185

PEPSIN INHIBITORS AND PREPARATION THEREOF

Sawao Murao, 8-12, 2-cho, Horiagemidori-cho, Osaka; Shuzo Satoi, 11-5, i- chome, Sumiyoshi- Kamokgahara cho, Kobe; Noriaki Kuwana, 74, Higashiohizumi-cho, Tokyo; Masayuki Fukumura, 2447-1, Hiratsuka Hirarsukushi, Hiratsuka, and Tamio Kawamura, 12-8, 5 chome, Koishikawa, Tokyo, all of Japan

Filed Apr. 28, 1971, Ser. No. 138,083

Claims priority, application Japan, Apr. 28, 1970, 45-35900

Int. Cl. C07c *103/52;* **C07g** *7/00;* **C08h** *1/00*

U.S. Cl. 260—112.5 **2 Claims**

1. A pepsin inhibitor S-PI which is acidic; soluble in water and aqueous alkali; insoluble in benzene, ether, petroleum, ether, chloroform, carbon tetrachloride, hexane and ethyl acetate; reacting negatively in the ninhydrin test, but positively after hydrolysis; convertible to a methyl ester by reaction with diazomethane in the presence of hydrogen chloride, convertible to a methyl ester by reaction with diazomethane in the presence of hydrogen chloride; and exhibiting an infrared curve substantially as shown in FIG. 1 hereof in a potassium bromide tablet.

3,878,186

PROCESS FOR PURIFYING INSULIN

Richard L. Jackson, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed May 9, 1973, Ser. No. 358,553

Int. Cl. A61k *17/04;* **C07c** *103/52;* **C07g** *7/00*

U.S. Cl. 260—112.7 **16 Claims**

1. A process for purifying an alkali metal or ammonium insulin which comprises the steps of:

A. swelling a gel having in the dry state a water regain of at least about 4 percent by weight and particle diameters smaller than about 100 microns;

B. packing a column with the swollen gel;

C. adding to the packed column an aqueous solution of an alkali metal or ammonium insulin having a purity of at least about 80 percent, wherein the insulin concentration is in the range of from about 1 to about 8 percent, weight per volume, the total amount of insulin is sufficient to provide a column loading in the range of from about 0.8 to about 6.7 grams per liter of bed volume, and the pH of the solution is in the range of from about 2.0 to about 3.5; and

D. eluting the insulin from the column, at a temperature in the range of from about 5° to about 30°C., with an aqueous eluant having a pH in the same range as that of the insulin solution.

3,878,187

POLYPEPTIDE DERIVATIVES OF AMPHETAMINE AND ANALOGS FOR IMMUNOASSAYS

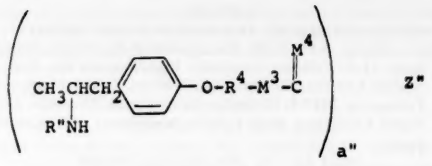
Richard S. Schneider, Sunnyvale, and Daniel Wagner, Palo Alto, both of Calif., assignors to Syva Company, Palo Alto, Calif.

Filed Sept. 11, 1972, Ser. No. 287,951

Int. Cl. C07g *7/00, 7/02*

U.S. Cl. 260—121 **3 Claims**

1. An amphetamine derivative of the formula:



wherein:

R'' is hydrogen or methyl;

R^4 is aliylene of from 1 to 4 carbon atoms;

M^3 is a bond;

M^4 is oxygen;

a'' is a number of from one to the molecular weight of Z'' divided by 1,500; and

Z'' is a polypeptide of at least 5,000 molecular weight, wherein Z'' is bonded through amino groups.

3,878,188

PROCESS FOR THE MANUFACTURE OF COLOURED POLYCYCLIC METAL COMPLEXES

Francois L'Eplattenier, Therwil, and Andre Pugin, Riehen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

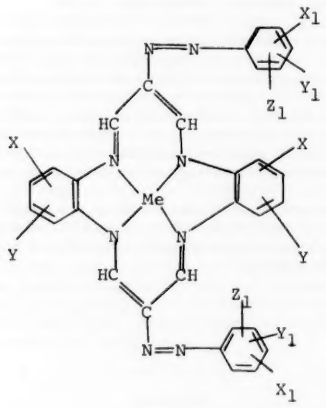
Filed Dec. 12, 1972, Ser. No. 314,492

Claims priority, application Switzerland, Dec. 15, 1971, 18356/71

Int. Cl. C09b *45/28, 45/30, 45/32*

U.S. Cl. 260—146 R **4 Claims**

1. A polycyclic metal complex of the formula



wherein X and Y is hydrogen, chloro, lower alkyl, lower alkoxy, phenoxy, phenyl, carboxy, lower alkoxycarbonyl, lower alkanoyl amino, aminocarbonyl, lower alkylsulphonyl or sulphonic acid group; Me is Cu,Zn,Ni or Co; X_1 and Y_1 are hydrogen, chloro, lower alkyl, lower alkoxy, phenoxy, phenylazo, lower acyl, trifluoromethyl, lower alkylsulphonyl, nitro, cyano, alkoxycarbonyl, acetylamino, aminocarbonyl, carboxylic acid group or sulphonic acid group; and Z_1 is hydrogen, chloro, or acetyl.

3,878,189

AZO DYE COMPOUNDS FROM AMINO-1,2-BENZISOTHIAZOLON-1,1-DIOXIDES

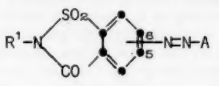
Clarence A. Coates, Jr., and Max A. Weaver, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed July 2, 1973, Ser. No. 376,094

Int. Cl. C09b *29/36*; **D06p** *3/54*

U.S. Cl. 260—155 **10 Claims**

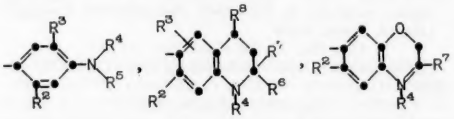
1. A disperse dye azo compound having the formula



wherein

R^1 is hydrogen; lower alkyl; arylmethylene; cyclohexylmethylene; 2-cyanoethyl; 2-carbamoylethyl; aryl; cyclohexyl; or the group $-Z-R^{17}$ in which Z is ethylene, propylene, or trimethylene and R^{17} is succinimido, glutarimido, phthalimido, hydroxy, lower alkanoyloxy, 2-pyrrolidinone, or lower alkoxy;

A is a group having the formula

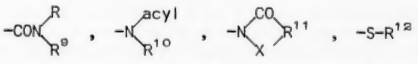


wherein:

R^2 is hydrogen, lower alkyl, lower alkoxy, chlorine, bromine or a group having the formula -NH-acyl;

R^3 is hydrogen, lower alkyl or lower alkoxy;

R^4 individually is alkyl containing one to eight carbon atoms; cyclohexyl; cyclohexyl substituted with lower alkyl; or lower alkyl substitued with lower alkoxy, aryl, aryloxy, cyclohexyl, cyano, lower alkanoyloxy, lower alkoxycarbonyl, lower alkoxycarbonyloxy, aroyloxy, lower alkylcarbamoyloxy, arylcarbamoyloxy, or a group having the formula



wherein

R individually is hydrogen, lower alkyl or aryl;

R^9 individually is hydrogen or lower alkyl;

R and R^9 collectively are $-(CH_2)_5-$ or $-CH_2CH_2OCH_2CH_2-$;

R^{10} is hydrogen, lower alkyl, aryl or cyclohexyl;

R^{11} is ethylene, propylene, trimethylene, o-cyclohexylene, or o-arylene, or when X is $-CO-$, R^{11} also can be $-NHCH_2-$, $-N(\text{lower alkyl})CH_2-$, $-SCH_2-$, $-OCH_2-$, or $-CH_2OCH_2-$;

X is $-CH_2-$, $-CO-$, or $-SO_2-$; and

R^{12} is aryl, benzyl, cyclohexyl, 1,2,4-triazol-3-yl, or 2-benzothiazolyl;

R^5 individually is hydrogen; lower alkyl; lower alkyl substituted with lower alkoxy, aryl, aryloxy, cyclohexyl, lower alkanoyloxy, lower alkoxycarbonyl or lower alkoxycarbonyloxy; allyl; or aryl;

R^4 and R^5 in combination is a group having the formula $-CH_2CH_2-Y-CH_2CH_2-$ in which Y is $-CH_2-$, $-O-$, $-S-$, $-N(\text{acyl})-$, $-SO-$ or $-SO_2-$;

R^6 is methyl or, when R^7 and R^8 each is hydrogen, R_6 can be lower alkyl;

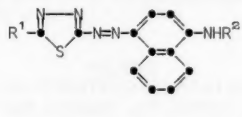
R^7 and R^8 each is hydrogen or methyl;
in which each aryl moiety is phenyl or phenyl substituted with lower alkyl, lower alkoxy, lower alkoxycarbonyl chlorine or bromine and each acyl is formyl; lower alkanoyl; lower alkanoyl substituted with chlorine, bromine, aryl, cyano, lower alkoxy, aryloxy, benzyloxy, lower alkylthio or lower alkylsulfonyl; aroyl; cyclohexoyl; lower alkoxycarbonyl; lower alkylsulfonyl; carbamoyl; lower alkylcarbamoyl; or furoyl;
and the 1,2-benzisothiazolon-1,1-dioxide group is bonded to the azo group at the 5- or 6-position.

3,878,190
THIADIAZOLYL-AZO-α-NAPHTHYLAMINE COMPOUNDS

Max Allen Weaver, and Herman Speight Pridgen, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed July 2, 1973, Ser. No. 376,049
Int. Cl. C09b *29/06*; **D06p** *1/18, 3/26*
U.S. Cl. 260—158 **3 Claims**

1. A compound having the formula



wherein
R^1 is hydrogen; alkyl of one to eight carbon atoms; lower alkylthio substituted with hydroxy, lower alkanoyloxy, succinimido, 2-pyrrolidinono, lower alkanoylamido, lower alkoxy, cyclohexyl, phenyl, or phenyl substituted with lower alkyl, lower alkoxy, chlorine or bromine; cyclohexylthio; lower alkylcyclohexylthio; lower alkanoylamido; chlorine; bromine; or aryl; and
R^2 is hydrogen; alkyl of one to eight carbon atoms; lower alkyl substituted with formamido, lower alkanoylamido, 2-pyrrolidinono, lower alkoxy, hydroxy, hydroxy-lower-alkoxy, carbamoyl, lower alkylcarbamoyl, aryloxy, aryl, cyclohexyl, lower alkanoyloxy, lower alkoxycarbonyl, succinimido, phthalimidino, lower alkylsulfonamido, lower alkylthio, arylthio, or lower alkoxycarbonylamido; aryl; cyclohexyl; cyclohexyl substituted with lower alkyl; or furfuryl; in which each aryl moiety is phenyl or phenyl substituted with lower alkyl, lower alkoxy, chlorine or bromine.

3,878,191
PROCESS FOR PREPARING SOLUBLE FLAVONOID GLYCOSIDES

Juichiro Fukumoto, Takarazuka, and Shigetaka Okada, Nara, both of Japan, assignors to Kyowa Hakko Kogyo Kabushiki Kaisha, Tokyo-to, Japan

Filed Feb. 7, 1972, Ser. No. 224,253
Claims priority, application Japan, Feb. 19, 1971, 46-7356
Int. Cl. C07c *15/12*; **C08b** *19/00*
U.S. Cl. 260—210 F **5 Claims**

1. A soluble flavonoid glycoside containing between 2 and 5 glucose substituents per molecule and wherein said substituents are glucoses selected from the group consisting of hesperetin-7-glucoside, citronin-7 glucoside, naringenin-7-glucoside, sakuranetin-5-glucoside, isosakuranetin-7-glucoside, and chalcons and dihydrochalcons thereof.

3,878,192
SWEET AND PALATABLE WATER SOLUBLE DERIVATIVES OF ERYTHROMYCIN

Pietro Blasina, Milan, and Egidio Molinari, Erba, both of Italy, assignors to Blasina, Lab. Chim. Farm., Milan, Italy

Filed June 5, 1972, Ser. No. 259,471
Int. Cl. C07c *129/18*
U.S. Cl. 260—210 E **11 Claims**

1. A water soluble derivative of an erythromycin antibiotic selected from the group consisting of erythromycin and esters thereof with a lower alkyl carboxylic acid, erythromycin ethylcarbonate, erythromycin ethyl succinate and glycyrrhizic acid.

3,878,193
PROCESS FOR THE PREPARATION OF GARAMINE DERIVATIVES

Hans Reimann, Wayne, N.J., assignor to Schering Corporation, Bloomfield, N.J.

Filed June 26, 1973, Ser. No. 373,691
Int. Cl. C07c *129/00*
U.S. Cl. 260—210 R **13 Claims**

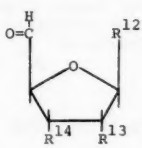
1. The process for preparing a garamine derivative having amino-protecting groups which comprises treatment of a pseudotrisaccharide having a garamine moiety 4-O-glycosidically linked to another pyranoside sugar which possesses an amino function and vicinal hydroxyl groups, said pseudotrisaccharide having amino-protecting groups selected from the group consisting of benzyloxycarbonyl, lower alkoxycarbonyl, (2,2,2-trichloroethoxy)-carbonyl, lower alkanoyl and aroyl having up to 8 carbon atoms, with a glycol cleaving reagent selected from the group consisting of a periodate salt and a lead (IV) salt; and treatment of the seco-dialdehyde derivative with a basic reagent selected from the group consisting of alkali metal hydroxides, alkaline earth metal hydroxides, alkali metal lower alkoxides, quaternary ammonium hydroxides, and ion exchange resins in the hydroxide form.

3,878,194
NOVEL PHOSPHORYLATED PHOSPHONIUM YLIDS

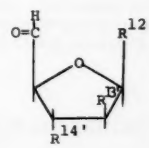
John G. Moffatt, and Gordon H. Jones, both of Los Altos, Calif., assignors to Syntex (U.S.A) Inc., Palo Alto, Calif.

Division of Ser. No. 709,234, Feb. 29, 1968, Pat. No. 3,662,031, which is a continuation-in-part of Ser. No. 654,056, June 18, 1967, abandoned. This application Oct. 15, 1971, Ser. No. 189,562
Int. Cl. C07d *51/50, 105/04*; **C07f** *9/54*
U.S. Cl. 260—211.5 R **8 Claims**

1. A process for preparing 5′,6′-dideoxy-hex-5′-enonucleosides 6′-phosphonates, which comprises reacting a nucleoside 5′-aldehyde selected from the group having the formulas:



and



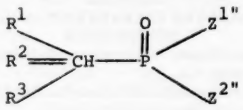
wherein
R^{12} is selected from the group consisting of uracil-1-yl, cytosin-1-yl, 4-chloro-1,2-dihydropyrimidin-2-on-1-yl, 5-bromouracil-1-yl, 5-bromocytosin-1-yl, 5-chlorouracil-1-yl, 5-chlorocytosin-1-yl, 5-iodouracil-1-yl, 5-iodocytosin-1-yl, 5-fluorouracil-1-yl, 5-fluorocytosin-1-yl, thymin-1-yl, 5-methylcytosin-1-yl, 5-trifluoromethyluracil-1-yl, 5-trifluoromethylcytosin-1-yl, 5-aminouracil-1-yl, 5-aminocytosin-1-yl, 5-methylaminouracil-1-yl, 5-

methylaminocytosin-1-yl, 5-hydroxyuracil-1-yl, 6-azauracil-1-yl, 6-azacytosin-1-yl, 4-chloro-6-aza-1,2-dihydropyrimidin-2-on-1-yl, 6-azathymin-1-yl, hypoxanthin-9-yl, adenin-9-yl, 6-dimethylaminopurin-9-yl, 2-chloroadenin-9-yl, 6-chloropurin-9-yl, 6-mercaptopurin-9-yl, guanin-9-yl, xanthin-9-yl, 2,6-dichloropurin-9-yl, 2,6-bis(methylamino)purin-9-yl, 8-azaadenin-9-yl, 8-azaguanin-9-yl, and 7-deazaadenin-9-yl; and

R^{13}, $R^{13'}$ R^{14}, and $R^{14'}$ are independently selected from the group of hydrogen, hydroxy, methoxy, acetoxy, and benzoyloxy, or

R^{13} and R^{14} together form acetal, isopropylidenedioxy or p-anisylidenedioxy

with a phosphorylated ylid having the formula

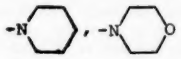


wherein

R^1, R^2 and R^3 are independently selected from the group of lower alkyl having from 1 to 6 carbon atoms, aryl having from 6 to 12 carbon atoms, or substituted aryl selected from the group of p-chlorobenzyl, p-bromobenzyl, 2,4,6-trichlorophenyl, p-nitrophenyl, p-nitrobenzyl, p-anisyl, p-methoxybenzyl, and p-dimethylaminophenyl or

R^1, R^2 and R^3 together are tri-N-piperidyl, tri-N-morpholinyl, or tricyclohexyl; and

$Z^{1''}$ and $Z^{2''}$ are independently selected from the group of $-OR^5$, $-SR^6$,



or $-NR^{7'}$ $R^{8'}$ in which

R^5 and R^6 are independently selected from the group of lower alkyl having from 1 to 6 carbon atoms, lower alkenyl having from 2 to 6 carbon atoms, aryl having from 6 to 12 carbon atoms or substituted aryl as defined herein above, and

$R^{7'}$ and $R^{8'}$ are independently lower alkyl having from 1 to 6carbon atoms or

$Z^{1''}$ and $Z^{2''}$ together form the group

in which

$R^{9'}$ is arylene having from 6 to 12 carbon atoms;

in a substantially anhydrous non-reactive organic solvent under reactive conditions thereby forming the corresponding 5',6'-dideoxy-hex-5'-eno-nucleoside 6'-phosphonate.

3,878,195

METHOD FOR THE MANUFACTURE OF MUSTARD MUCILAGE

Steven A. Taillie, and Frank E. Weber, both of Rochester, N.Y., assignors to R. T. French Company, Rochester, N.Y.

Filed Oct. 16, 1973, Ser. No. 406,789

Int. Cl. C08b *15/00, 29/00*

U.S. Cl. 260—212 **19 Claims**

1. The method of preparing mustard mucilage, comprising defatting whole yellow mustard bran by extracting mustard oil and free sugar from the whole bran,

mixing water with the defatted bran to form an aqueous slurry having a neutral pH in the approximate range of 6.8 to 7.2,

maintaining said aqueous slurry for a predetermined interval at an elevated temperature not exceeding 70° Centigrade,

separating the heated slurry after said interval into a wet bran cake and aqueous mucilage, and

drying said aqueous mucilage.

3,878,196

PROCESS FOR MODIFYING STARCH TO OBTAIN A THIXOTROPIC STARCH

Glen C. Glasscock, Warsaw, Ill., and Joseph E. Boyle, Keokuk, Iowa, assignors to The Hubinger Company, Keokuk, Iowa

Filed Nov. 21, 1973, Ser. No. 417,957

Int. Cl. C08b *19/06*

U.S. Cl. 260—233.3 A **9 Claims**

1. A process of producing a thixotropic starch which comprises reacting a starch in the form of solid particles with 0.01 to 10.0% by weight of an aldehyde, carrying out said reaction at a predetermined pH within the range of 0.1 to 9.9 at a temperature within the range of 30°F. to 350°F. for 1 minute to 40 hours while maintaining an excess of said aldehyde, washing the resultant product with water sufficiently to remove the excess aldehyde, the temperature and time of heating being such that a thixotropic starch is obtained after removal of excess aldehyde by washing with water, and recovering the solid thixotropic starch.

3,878,197

PROCESS FOR PREPARING EXTRACTS OF ALOE VERA

Ray H. Maret, Garland, Tex., assignor to Ray H. Maret and Henry R. Cobble, both of Garland, Tex.

Filed Dec. 13, 1972, Ser. No. 314,534

Int. Cl. C07g *1/00;* **B01j** *1/10*

U.S. Cl. 260—236.5 **7 Claims**

1. The process of preparing an extract of aloe vera comprising the steps of:

a. cutting the rind and aloins of an aloe vera leaf from the gel, and

b. agitating the gel under U.V. radiation in a digestion liquid containing amine, phosphorous ions and potassium ions while maintaining the pH of the liquid in the range of about 3 to about 4.5.

3,878,198

β-KETOACYL DERIVATIVES OF 6-AMINOPENICILLANIC ACID AND PROCESS THEREOF

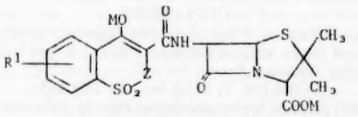
Jagadish C. Sircar, Dover; Harold Zinnes, Rockaway, and John Shavel, Jr., Mendham, all of N.J., assignors to Warner-Lambert Company, Morris Plaines, N.J.

Filed Apr. 26, 1974, Ser. No. 464,707

Int. Cl. C07d *99/14*

U.S. Cl. 260—239.1 **2 Claims**

1. A compound of the formula



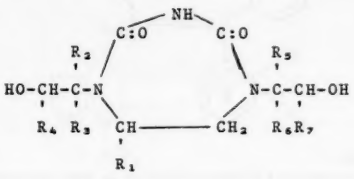
wherein R^1 is hydrogen, alkyl of 1 to 7 carbon atoms, halogen, alkoxy of 1 to 7 carbon atoms, cyano and trifluoromethyl; Z is NR^2; R^2 is hydrogen, alkyl of 1 to 7 carbon and aralkyl wherein the alkyl moiety contains from 1 to 7 carbon atoms and the aryl moiety is a monocyclic aromatic radical of 6 to 10 carbon atoms and M is alkali metal or alkaline earth metal.

3,878,199
HYDROXYALKYL DERIVATIVES OF 1,3,5-TRIAZACYCLOHEPTANE-2,4-DIONES

Alvin F. Beale, Jr., Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed July 23, 1973, Ser. No. 381,931
Int. Cl. C07d 55/54
U.S. Cl. 260—239.3 R 10 Claims

1. A 1,3,5-triazacycloheptane-2,4-dione compound having the formula:



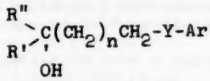
wherein R_1 is independently hydrogen or an alkyl group of 1–10 carbons, R_2 and R_5 are independently hydrogen or a methyl group, R_3 and R_6 are independently hydrogen or a hydroxymethyl group and R_4 and R_7 are independently hydrogen, or an alkyl group of 1–7 carbons.

3,878,200
ARYL SUBSTITUTED TERTIARY CARBINOLS

Guy D. Diana, Stephentown, and William B. Hinshaw, Jr., Sand Lake, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Filed Jan. 17, 1973, Ser. No. 324,540
Int. Cl. C07d 13/10
U.S. Cl. 260—240 R 7 Claims

1. A compound of the formula



wherein Y is selected from the group consisting of

and

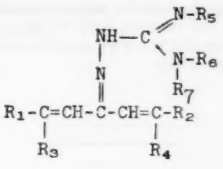
R′ is lower-alkyl or lower-alkenyl of 1 to 4 carbon atoms;
R″ is lower-alkyl of 1 to 4 carbon atoms;
or R′ and R″ can be joined to form a cyclopentane or cyclohexane ring;
n is 1 or 2;
R is hydrogen or lower-alkyl of 1 to 4 carbon atoms; and
Ar is phenyl substituted by 3,4-methylenedioxy or one or two monovalent substitutents selected from the group consisting of halogen, trifluoromethyl and trifluoromethoxy.

3,878,201
1,5-BIS SUBSTITUTED-1,4-PENTADIEN-3-ONE SUBSTITUTED AMIDINOHYDRAZONE SALTS AND METHOD OF PREPARING THE SAME

Andrew Stephen Tomcufcik, Old Tappan, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 131,412, April 5, 1971, abandoned. This application Mar. 1, 1973, Ser. No. 337,033
Int. Cl. C07c 133/10; C09b 23/00
U.S. Cl. 260—240 G 12 Claims

1. A pentadiene of the formula:



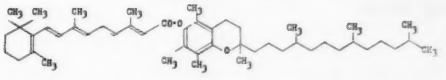
wherein R_1 and R_2 may be the same or different and are selected from the group consisting of phenyl, halophenyl, carboxyphenyl, lower alkoxy(C_1–C_4)phenyl, diloweralkoxy(C_1–C_4)phenyl, biphenylyl, alkyl(C_1–C_4)phenyl, dialkyl(C_2–C_8)-phenyl, nitrophenyl, trifluoromethylphenyl, lower alkyl(C_1–C_4)sulfonylphenyl, lower alkyl(C_1–C_4)thiophenyl, methylenedioxyphenyl, cyanophenyl, sulfamylphenyl, carboloweralkoxy(C_1–C_4)phenyl, naphthyl, lower alkoxy(C_1–C_4)naphthyl and halonaphthyl; R_3 and R_4 may be the same or different and are selected from the group consisting of hydrogen, lower alkyl C_1–C_4, phenyl and halophenyl; R_5 and R_6 are lower alkyl C_1–C_4 and when taken together an alkylene group of 2 to 9 carbon atoms, methyl or a phenyl alkylene group of 2 to 4 carbon atoms, a dimethyl or diphenyl alkylene group of 2 to 4 carbon atoms and R_7 is hydrogen or lower alkyl C_1–C_4, and non-toxic acid salts thereof.

3,878,202
VITAMIN A-ACID ESTERS OF α-TOCOPHEROL AND PREPARATION THEREOF

Hideaki Fukawa, Kawagoe, and Kenichi Tanaka, Tokyo, both of Japan, assignors to Nisshin Flour Milling Co., Ltd., Tokyo, Japan

Filed May 17, 1972, Ser. No. 254,046
Int. Cl. C07d 7/22
U.S. Cl. 260—240 H 3 Claims

1. A compound of the formula

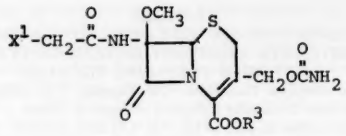


3,878,203
METHOD FOR THE PREPARATION OF CEPHALOSPORIN DERIVATIVES

Burton G. Christensen, Scotch Plains, and Raymond A. Firestone, Fanwood, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Dec. 16, 1971, Ser. No. 208,939
Int. Cl. C07d 99/24
U.S. Cl. 260—243 C 4 Claims

1. The method wherein a 2-thienyl metallide is reacted with a compound of the formula:



wherein R^3 is lower alkyl, lower alkoxy alkyl, tri-lower-alkylsilyl, polyhalo lower alkyl wherein polyhalo indicates 2-3 halogen substituents, lower alkenyl, lower alkynyl, phenyl, benzyl, wherein the benzene ring is unsubstituted or may be substituted by one or more nitro or lower alkoxy moieties, benzhydryl, phenacyl, lower alkanoyloxymethyl or pivaloyloxymethyl; and X^1 is halo.

3,878,204

CEPHALOSPORIN DERIVATIVES

Michihiko Ochiai, Suita; Osami Aki, Kawanishi; Akira Morimoto, Suita; Taiiti Okada, Kyoto, and Katsutada Masuda, Ashiya, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

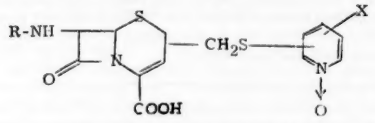
Filed July 29, 1971, Ser. No. 167,454

Claims priority, application Japan, Nov. 10, 1970, 45-99203

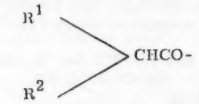
Int. Cl. C07d *99/24*

U.S. Cl. 260—243 C **19 Claims**

1. A compound of the formula,



wherein R is a hydrogen or an acyl group of the formula,



wherein R^1 is phenyl, phenoxy, cyclohexenyl, thienyl, or 3-amino-3-carboxypropyl group; and R^2 is hydrogen or amino group; and X is hydrogen, chlorine, or bromine; or a sodium, potassium, magnesium, calcium, aluminum or triethylamine salt thereof.

3,878,205

DIAZEPINE DERIVATIVES

Andre Gagneux, Basel; Roland Heckendorn, Arlesheim, and Rene Meier, Buus, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

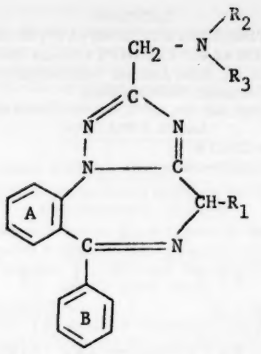
Filed July 14, 1972, Ser. No. 272,088

Claims priority, application Switzerland, July 23, 1971, 10885/71

Int. Cl. C07d *57/02, 99/02*

U.S. Cl. 260—247.5 EP **20 Claims**

1. A diazepine derivative of the formula I



wherein

R_1 represents a hydrogen atom or an alkyl group having from 1 to 3 carbon atoms,

R_2 and R_3, independently of each other, represent a hydrogen atom, an alkyl or hydroxyalkyl group having from 1 to 6 carbon atoms, or an aralkyl group having from 7 to 9 carbon atoms, whereby, when R_2 and R_3 simultaneously represent alkyl groups as aforesaid, these alkyl groups may optionally be bound together in the β- or γ-position either directly or via an oxygen atom or imino group, or alkylimino or hydroxyalkylimino group having at most 4 carbon atoms, and

wherein each of the rings A and B, independently of the other; is unsubstituted or substituted by one chlorine atom, fluorine atom, bromine atom, trifluoromethyl group, nitro group, alkyl group, or alkoxy group having from 1 to 6 carbon atoms, its 5-oxide and the pharmaceutically acceptable acid addition salts of said diazepine derivative or of its 5-oxide.

3,878,206

9-(SUBSTITUTED AMINO)IMIDAZO [4,5-f]QUINOLINES

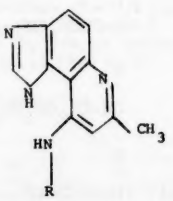
Claude F. Spencer, and Harry R. Snyder, Jr., both of Norwich, N.Y., assignors to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed June 6, 1973, Ser. No. 367,498

Int. Cl. C07d *33/52*

U.S. Cl. 260—247.5 EP **22 Claims**

1. A compound of the formula:



wherein R is 4-ethylphenyl, 4-(2-hydroxyethyl)phenyl, 4-n-dodecylphenyl, 9-anthryl, 4-chlorophenyl, 4-fluorophenyl, 3-chlorophenyl, 4-acetylaminophenyl, 4-(N-methylacetylamino)phenyl, 4-methylaminophenyl, 4-aminophenyl, 4-morpholinophenyl, 4-pyrrolidinophenyl, 4-[N-methyl-N(-2-hydroxyethyl)amino]phenyl, 3-chloro-4-hydroxyphenyl, 4-carbethoxy phenyl, 3-chloro-4-morpholinophenyl, 4-hydroxyphenyl, 3-hydroxyphenyl, 4-benzoylphenyl, or 2-methoxy-5-acetylphenyl.

3,878,207

NOVEL AMINE DERIVATIVES OF 4,8 DIMETHOXY FURO (3',2'-f) BENZOXAZOLE

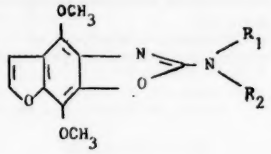
Claude P. Fauran, Paris; Jeannine A. Eberle, Chatou; Guy M. Raynaud, Paris, and Yves J. Bailly, Nanterre, all of France, assignors to Delalande S.A., Courbevoie, France

Filed Oct. 11, 1973, Ser. No. 405,650

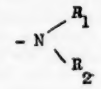
Int. Cl. C07d *85/48*

U.S. Cl. 260—247.5 EP 8 Claims

1. A compound of the formula:



in which the group



represents:

a propylamino, phenylamino or dimethylamino radical or a pyrrolidino, piperidino or morpholino ring.

3,878,208

TREATMENT OF AQUEOUS WASTE STREAMS WITH HYDROGEN PEROXIDE TO REMOVE CHLORINATED ISOCYANURATES THEREFROM

Ronald H. Carlson, Willingboro; Raymond N. Mesiah, Somerset, both of N.J., and Harold R. Chancey, Charleston, W. Va., assignors to FMC Corporation, New York, N.Y.

Filed Dec. 14, 1973, Ser. No. 425,167

Int. Cl. C07d *55/36*

U.S. Cl. 260—248 A 4 Claims

1. In the manufacture of chlorinated isocyanurates wherein there is produced an aqueous waste stream having a pH of from about 0.5 to about 7.0 and containing dissolved therein chlorinated isocyanurate values, a method of removing such chlorinated isocyanurate values from the waste streams by treating said streams with hydrogen peroxide at a pH of from about 0.5 to about 12 whereby the chlorinated isocyanurate values are dechlorinated to produce a precipitate of cyanurate values and recovering the precipitated cyanurate values from the so-treated stream.

3,878,209

0-6(7)-METHOXY-QUINOXALINYL(2)-(THIONO)PHOSPHORIC (PHOSPHONIC) ACID ESTERS AND ESTER AMIDES

Karl-Julius Schmidt, Wuppertal-Vohwinkel; Ingeborg Hammann, Cologne, and Bernhard Homeyer, Opladen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

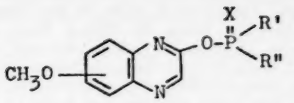
Filed Aug. 28, 1972, Ser. No. 284,324

Claims priority, application Germany, Sept. 4, 1971, 2144391

Int. Cl. C07d *51/78*

U.S. Cl. 260—250 QP 7 Claims

1. An 0-6(7)-methoxy-quinoxalyl(thiono)phosphoric(phosphonic) acid ester of the formula



[(I)]

in which

R' is alkoxy with up to 10 carbon atoms,

R'' is alkyl or alkoxy with up to 6 carbon atoms,

the CH_3O radical is in the 6- or 7- position, and

X is oxygen or sulfur.

3,878,210

PYRIDAZINOTHIONOPHOSPHORIC (-PHOSPHONIC) ACID ESTERS

Walter Lorenz, Wuppertal-Cronenberg, and Ingeborg Hammann, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

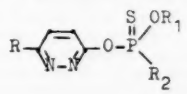
Filed Sept. 23, 1970, Ser. No. 74,864

Claims priority, application Germany, Oct. 7, 1969, 1950491

Int. Cl. C07d *51/04*

U.S. Cl. 260—250 AP 11 Claims

1. Pyridazinothionophosphoric (-phosphonic) acid esters of the general formula



(I)

in which

R is a lower alkyl or phenyl radical,

R_1 is a branched or straight-chain lower alkyl radical, and

R_2 is a branched or straight-chain lower alkoxy or alkyl or phenyl radical.

3,878,211

PROCESS FOR THE MANUFACTURE OF 1,4-DIAMINOPHTHAIAZINE

Klaus-Dieter Steffen, Troisdorf-Oberlar, Germany, assignor to Dynamit Nobel AG, Troisdorf (Bez Koln), Germany

Filed Oct. 4, 1972, Ser. No. 295,036

Claims priority, application Germany, Oct. 28, 1971, 2153693

Int. Cl. C07d *51/06*

U.S. Cl. 260—250 P 6 Claims

1. In a process for the preparation of 1.4-diaminophthalazine by reaction of phthalonitrile with hydrazine, the improvement which comprises the steps of carrying out the process in the presence of elemental sulfur, a sulfide or polysulfide of an alkaline metal or ammonium.

3,878,212
BLOOD SUGAR LOWERING SULFAMOYL PYRIMIDINES AND ASYMMETRICAL CARBON ATOM

Clemens Rufer, Cimbernstr. 6, Berlin 38; Hans Ahrens, Spanische Allee 72a, Berlin 38; Helmut Biere, Joachim-Friedrich-Str. 13, Berlin 31; Eberhard Schroder, Am Rosenanger 22, Berlin 28; Erich Gerhards, Maximiliankorso 20, Berlin 28; Ekkehard Schillinger, Lagardestr. 44a, Berlin 38; Wolfgang Felix Losert, Hauptstr. 118, Berlin 62, and Olaf Loge, Bekassinenweg 37, Berlin 27, all of Germany

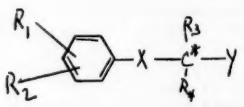
Continuation of Ser. No. 129,948, March 31, 1971, abandoned. This application July 5, 1973, Ser. No. 377,944

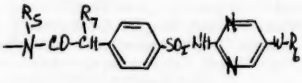
Claims priority, application Germany, Apr. 28, 1970, 2021962

Int. Cl. C07a *51/42*

U.S. Cl. 260—256.5 R **19 Claims**

1. Racemates and optical antipodes of sulfamoyl pyrimidines of the general formula





wherein

C* is an asymmetric C atom,

X and Y are identical or different and each by itself represents a direct bond or a methylene group except that X and Y cannot both be a direct bond,

R_1 and R_2 hydrogen or halogen atoms, alkyl groups with 1 – 6 C atoms or alkoxy groups with 1 – 4 C atoms,

R_3 and R_4 are different and represent hydrogen atoms, straight-chain or branched alkyl (with 1–4 C atoms), carboxyl or alkoxy carbonyl groups (with 1–4 C atoms) R_5 and R_7 are identical or different and represent hydrogen atoms or low alkyl groups with 1–4 C atoms,

R_6 a straight-chain or branched alkyl group with 1–6 C atoms, and

W a direct C—C bond or an oxygen or sulfur atom, as well as their salts with physiologically tolerable bases.

3,878,213
CERTAIN 4-(N-PYRIMIDIN-2-YLSULFAMOYL)-PHENYLACETAMIDES

Hanns Ahrens, Spanische Allee 72a, 1 Berlin 38; Helmut Biere, Joachim-Friedrich-Str. 13, 1 Berlin 31; Clemens Rufer, 38 Lagardestr. 44a, 1 Berlin 38; Wolfgang Felix Losert, Maximilankorso 20, 1 Berlin 28; Olaf Loge, Hauptstr. 118, 1 Berlin 62; Ekkehard Schillinger, Bekassinenweg, 37, 1 Berlin 27; Eberhard Schroder, Am Rosenanger 22, Berlin 28, and Erich Gerhards, Cimbernstr. 6, Berlin 38, all of Germany

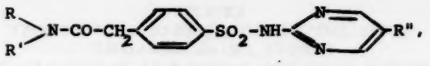
Continuation-in-part of Ser. No. 129,948, March 31, 1971, abandoned. This application Sept. 13, 1972, Ser. No. 288,590

Claims priority, application Germany, Oct. 5, 1971, 2150279

Int. Cl. C07d *51/42*

U.S. Cl. 260—256.5 R **13 Claims**

1. A compound which is a sulfamoylpyrimidine of the formula



wherein

R is 1-tetrahydronaphthyl, 1-indanyl, 1-α-naphthylethyl, 1-(2-pyridyl)-ethyl, 1-phenyl-2,2,2-trifluoroethyl, 1-cyanobenzyl, 1-(2-phenyl)-phenylethyl, or 1-(N-methyl-3-indolyl)-ethyl;

R′ is hydrogen, or

R and R′ jointly with the connecting nitrogen atom are 2-methylindolyl; and

R″ is isobutyl, neopentyl, or isopropoxy; or

a salt of said sulfamoylpyrimidine with a physiologically tolerated base.

3,878,214
TRIVALENT METAL SALTS OF DODECARHODIUMTRIACONTA CARBONYLS

Wellington E. Walker, Charleston; Earle S. Brown, S. Charleston, and Roy L. Pruett, Charleston, all of W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed June 19, 1973, Ser. No. 371,341

Int. Cl. C01g *55/00, 1/04*

U.S. Cl. 423—263 **7 Claims**

1. Rhodium carbonyl salts of the formula

$$M_2\,[Rh_{12}(CO)_{30}]_3$$

wherein M is aluminum, gallium, iridium, scandium, yttrium and rhenium.

3,878,215
2-ALKYL-3-SUBSTITUTED-4-ARYL ISOQUINOLINES

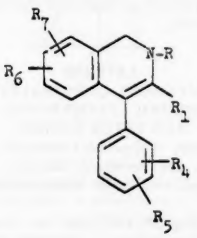
William J. Houlihan, Mountain Lakes, and Jeffrey Nadelson, Lake Parsippany, both of N.J., assignors to Sandoz-Wander, Inc., Hanover, N.J.

Continuation-in-part of Ser. No. 205,324, Dec., 1971, abandoned. This application Sept. 21, 1973, Ser. No. 399,431

Int. Cl. C07d *33/14*

U.S. Cl. 260—283 R **2 Claims**

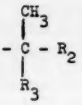
1. A compound of the formula



where

R represents lower alkyl,

R_1 represents



where

R_2 and R_3 are each, independently, methyl or ethyl, or R_2 and R_3 together represent $(CH_2)_n$ where

n represents 4, 5, or 6, and

R_4, R_5, R_6, and R_7 each, independently, represent hydrogen, halo of atomic weight 19–36, trifluoromethyl, lower alkyl, or lower alkoxy,

provided that R_6 and R_7 may not represent alkyl at the 8-position, and provided further that two trifluoromethyl or two tertiary butyl groups or a trifluoromethyl and a tertiary butyl group are not on adjacent carbon atoms, or a pharmaceutically acceptable acid addition salt thereof.

3,878,216
2-SULPHENYLIMINO-5-AMINO-1,3-DITHIANES

Rupert Schneider, 4125 Richen, Switzerland, assignor to Sandoz Ltd., a/k/a Sandoz AG, Basel, Switzerland

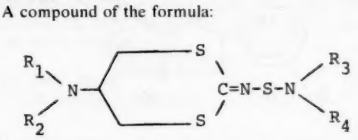
Filed July 30, 1973, Ser. No. 383,823

Claims priority, application Switzerland, Aug. 15, 1972, 12056/72

Int. Cl. C07d *29/36*

U.S. Cl. 260—293.68 **12 Claims**

1. A compound of the formula:



wherein

R_1 is alkyl of 1 to 5 carbon atoms,

R_2 is hydrogen or alkyl of 1 to 5 carbon atoms, and

$R_3$and R_4 are independently alkyl or 1 to 5 carbon atoms or together with the nitrogen atom to which they are bound form piperidino, pyrrolidino, piperazino or morpholino,

in free base or agriculturally acceptable acid addition salt form.

3,878,217
ALPHA-ARYL-4-SUBSTITUTED PIPERIDINOALKANOL DERIVATIVES

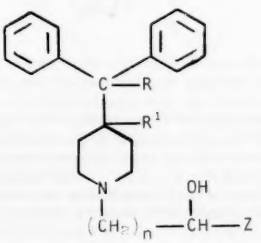
Albert A. Carr, and Richard Kinsolving, both of Cincinnati, Ohio, assignors to Richardson-Merrell Inc., New York, N.Y.

Continuation-in-part of Ser. No. 221,821, Jan. 28, 1972, abandoned. This application July 12, 1973, Ser. No. 378,561

Int. Cl. C07d *29/28*

U.S. Cl. 260—293.64 **20 Claims**

1. A compound selected from a base of the formula



wherein R is selected from the group consisting of hydrogen or hydroxy; R^1 is hydrogen; or R and R^1 taken together form a second bond between the carbon atoms bearing R and R^1; n is a positive whole integer of from 1 to 3; and Z is selected from the group consisting of thienyl, phenyl, or substituted phenyl wherein the substituents on the substituted pheny may be attached at the ortho, meta, or para positions of the substituted phenyl ring and are selected from the group consisting of a halogen atom, a straight or branched lower alkyl chain of from 1 to 4 carbon atoms, a lower alkoxy group of from 1 to 4 carbon atoms, a di(lower)alkylamino group, or a saturated monocyclic heterocyclic ring selected from the group consisting of pyrrolidino, piperidino, morpholino, or N-(lower)alkylpiperazino, or pharmaceutically acceptable acid addition salts thereof.

3,878,218
4,4-DIACYLDIPHENYL-2-PYRIDYLACETATES AND DERIVATIVES

Tiberio Bruzzese, and Rodolfo Ferrari, both of Milan, Italy, assignors to SPA-Societa Prodotti Antibiotici S.p.A., Milan, Italy

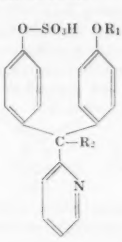
Filed July 2, 1973, Ser. No. 375,477

Claims priority, application United Kingdom, May 30, 1973, 25633/73

Int. Cl. C07d *31/48*

U.S. Cl. 260—294.8 R **7 Claims**

1. A compound of the formula:



wherein R_1 is hydrogen, a sulphoxy group or alkanoyl containing up to 6 carbon atoms, and a pharmaceutically-acceptable, non-toxic inorganic or organic salt thereof.

3,878,219
5H-[1]BENZOPYRANO[3,4-D]PYRIDINES

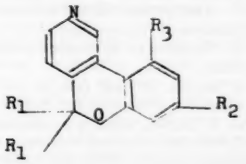
Cheuk Man Lee, Waukegan, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Filed July 13, 1973, Ser. No. 379,016

Int. Cl. C07d *31/34*

U.S. Cl. 260—295 T **3 Claims**

1. A compound having the following formula



wherein each R_1 is lower alkyl, R_3 is lower alkanoyloxy and R_2 is lower alkyl, cycloalkyl or

wherein Y is a straight or branched chain alkylene group having from 1 to 10 carbon atoms and each R_4, R_5 and R_6 are the same or different members selected from the group consisting of hydrogen halo, trifluoromethyl or loweralkyl.

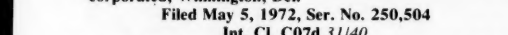
3,878,220

POLYFUNCTIONAL QUATERNARY AMIDOXIMIDINIUM SALTS

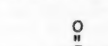
David S. Breslow, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed May 5, 1972, Ser. No. 250,504
Int. Cl. C07d *31/40*
U.S. Cl. 260—296 M **13 Claims**

1. A polyfunctional compound having the formula



wherein R is an organic radical selected from the group consisting of hydrocarbon, halide substituted hydrocarbon, hydrocarbon-oxy-hydrocarbon, hydrocarbon-thio-hydrocarbon and hydrocarbon-sulfonyl-hydrocarbon radicals, said hydrocarbon radical being selected from the group consisting of alkylene radicals containing 2–18 carbon atoms, arylene radicals containing 1–2 rings, cycloalkylene radicals containing 4–8 carbon atoms, arylene-dialkylene radicals containing 8–10 carbon atoms, alkylene-diarylene radicals containing 13–14 carbon atoms, and cycloalkylene-dialkylene radicals containing 7–8 carbon atoms, A is



b is zero or 1, tert. organic amine is selected from the group consisting of pyridine and methyl, methoxy, cyano and benzyl substituted pyridine having a dissociation constant greater than 1×10^{-12} as determined at 25°C., Z is chloride, bromide or iodide, *c* and *d* are zero or 1, with *c* being 1 when d is zero, and with *d* being 1 when *c* is zero, and X is the anion of an acid having a dissociation constant greater than 1.0×10^{-3} as determined at 25°C., the number of X's being equal to the number of tert. organic amines when X is monovalent and being equal to one-half the number of tert. organic amines when X is divalent.

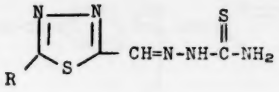
3,878,221

5-SUBSTITUTED 1,3,4-THIADIAZOLE-2-CARBOXALDEHYDE THIOSEMICARBAZONES

Gerald Berkelhammer, Princeton, and Goro Asato, Titusville, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 300,640, Oct. 25, 1972, Pat. No. 3,794,665, which is a division of Ser. No. 92,908, Nov. 25, 1970, Pat. No. 3,725,396, which is a continuation-in-part of Ser. No. 767,004, Oct. 11, 1968, Pat. No. 3,598,830. This application Oct. 31, 1973, Ser. No. 411,574
Int. Cl. C07d *91/62*
U.S. Cl. 260—302 D **4 Claims**

1. A compound of the formula:



wherein R is selected from the group consisting of amino, nitro and acetamids.

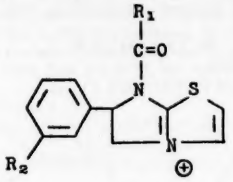
3,878,222

METHODS OF PREPARING SUBSTITUTED IMIDAZOTHIAZOLIUM COMPOUNDS

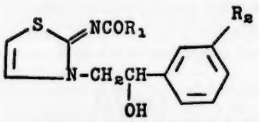
Larry Dean Spicer, Princeton, and John James Hand, Trenton, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 234,323, March 13, 1972, Pat. No. 3,792,166, which is a continuation-in-part of Ser. No. 90,141, Nov. 16, 1970, Pat. No. 3,708,490, which is a continuation-in-part of Ser. No. 3,220, Jan. 15, 1970, abandoned. This application Nov. 22, 1972, Ser. No. 308,919
Int. Cl. C07d *99/10*
U.S. Cl. 260—306.8 F **7 Claims**

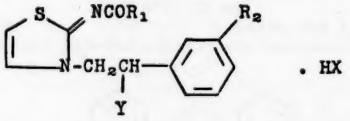
1. A method for the preparation of compounds of the formula:



where R_1 is hydrogen, alkyl (C_1 to C_{17}), lower alkoxy (C_1 to C_4), lower carboalkoxy lower alkyl, phenyl, halophenyl, or loweralkylphenyl; R_2 is hydrogen, nitro, halogen, trifluoromethyl, formylamino or alkanoyl (C_1 –C_4) amino and X is a pharmaceutically acceptable anion; comprising treating a compound of the formula:



where R_1 and R_2 are as described above, with at least one mole equivalent of a compound selected from the group consisting of thionyl chloride, phosphorus trichloride and phosphorus tribromide to form a compound of the formula:



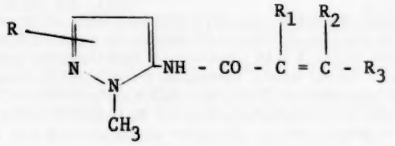
wherein R_1, R_2 are as described above and Y is chlorine or bromine; and treating the thus formed compound with (1) acetic anhydride in an inert organic solvent at a temperature between 50°C. and 200°C. to produce the ring closed compound; or (2) by neutralization of the thus formed acid salt with a basic ion exchange resin, aqueous sodium bicarbonate or a lower trialkylamine (C_3–C_{12}) and heating of the thus formed free base in the presence of an inert solvent at a temperature of from about 30°C. to 100°C. to form the ring closed product.

3,878,223
N-SUBSTITUTED ACRYLAMIDES

David Lyon Garmaise, Montreal, and Gerard Yvon Paris, Duvernay, Quebec, both of Canada, assignors to Abbott Laboratories, North Chicago, Ill.

Filed Mar. 12, 1973, Ser. No. 340,622
Int. Cl. C07d *49/20*
U.S. Cl. 260—310 R **2 Claims**

1. A compound of the formula:



wherein R represents a methyl substituent and wherein R_1, R_2 and R_3 independently represent hydrogen or chlorine with the further proviso that at least one of the substituents R_1, R_2 or R_3 be chlorine or a nontoxic acid addition salt thereof.

3,878,224
N-SUBSTITUTED-Δ′-TETRAHYDROPHTHALIMIDES

Kazuo Matsui; Hiroshi Kasugai, both of Tokyo; Kuni Matsuya, and Hiroyasu Aizawa, both of Kawasaki, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

Filed Dec. 14, 1971, Ser. No. 207,957
Claims priority, application Japan, Dec. 23, 1970, 45-84803; Oct. 14, 1971, 46-81083; Oct. 18, 1971, 46-82349; Oct. 26, 1971, 46-84803
Int. Cl. C07d *27/52*
U.S. Cl. 260—326 R **19 Claims**

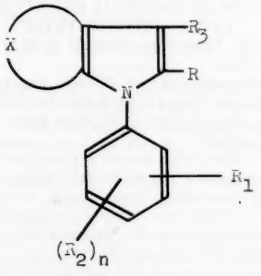
15. N-(4-ethylphenyl)-Δ^1-tetrahydrophthalimide.

3,878,225
CONDENSED PYRROLES BEARING AN N-PHENYL SUBSTITUENT

Richard C. Allen, Somerville, and V. Brian Anderson, High Bridge, both of N.J., assignors to American Hoechst Corporation, Bridgewater, N.J.

Filed Mar. 1, 1973, Ser. No. 336,919
Int. Cl. C07d *27/56*
U.S. Cl. 260—326.12 R **12 Claims**

1. A compound of the formula



wherein

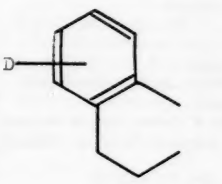
R is alkyl of 1 to 6 carbon atoms; thienyl; phenyl; diphenyl; or phenyl substituted by halogen, trifluoromethyl, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, nitro, cyano, or hydroxy;

R_1 is carboxyl, alkoxycarbonyl of 2 to 7 carbon atoms, carbamoyl, N-alkylcarbamoyl of 2 to 7 carbon atoms, N,N-dialkylcarbamoyl of 3 to 7 carbon atoms, hydroxycarbamoyl, or dialkylphosphinylalkoxycarbonyl of 4 to 10 carbon atoms;

R_2 is hydrogen, hydroxyl, mercapto, halogen, trifluoromethyl, alkoxy of 1 to 6 carbon atoms, alkanoyloxy of 1 to 6 carbon atoms, amino, alkanoylamino of 1 to 6 carbon atoms, dialkylthiocarbamoyloxy of 3 to 7 carbon atoms, or dialkylcarbamoylthio of 3 to 7 carbon atoms; *n* is 1 or 2;

R_3 is hydrogen, alkanoyl of 1 to 6 carbon atoms, or phenyl;

X is alkylene of 3 to 5 carbon atoms, alkylene of 3 to 5 carbon atoms substituted by alkyl or alkoxy of 1 to 6 carbon atoms, divinylene, divinylene substituted by alkyl of 1 to 6 carbon atoms,



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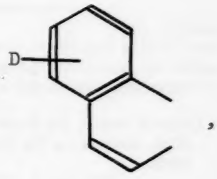

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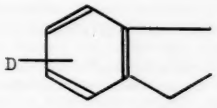
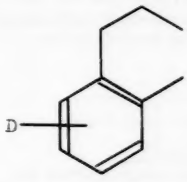


, or



,

wherein D is hydrogen, alkoxy of 1 to 6 carbon atoms, or halogen.

3,878,226
TELOMERS, THEIR PREPARATION AND THEIR USE

Pierre Couderc, Aix Noulette; Daniel Roussel, Bully-les-Mines, and Jean Croisier, Bethune, all of France, assignors to Societe Chimique des Charbonnages C.d.F. Chimie, Paris, France

Filed June 27, 1972, Ser. No. 266,675
Claims priority, application France, June 29, 1971, 71.23793
Int. Cl. C07d *15/04, 15/06*
U.S. Cl. 260—340.7 **2 Claims**

1. A telomer obtained by telomerising vinyl acetate in the presence of carbon tetrachloride at a temperature of about 20°C to 85°C and in the presence of a polymerisation initiator until a product is obtained having a degree of polymerisation DP such that:

$$DP = \frac{7100}{43\,x} - \frac{78}{43}$$

where x is the % by weight of chlorine in said product, said product then being reacted, in solution, with hydrogen peroxide in glacial acetic acid at a temperature of 50°C to 75°C in the relative proportions of substantially 1 equivalent of free oxygen per equivalent of chlorine contained in said product; then acetalising the product thus obtained with formaldehyde in an inorganic acid medium and recovering the telomer obtained by neutralisation.

3,878,227

PROCESS FOR MAKING TERT.-BUTYL GLYCIDYL ETHER

Arthur R. Sexton, and Frederick P. Corson, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 7, 1973, Ser. No. 422,806
Int. Cl. C07d *1/18*
U.S. Cl. 260—348.6 **4 Claims**

1. The process for making tertiary-butyl glycidyl ether comprising

1. butylating a glycerol α-monohalohydrin by reaction with isobutylene, thus to produce a mixture of the 1- and 2-tert.-butyl monoethers and the 1,2-di-(tert.-butyl ether) of the halohydrin;
2. selectively dehydrohalogenating the 1-monoether by reaction with a dehydrohalogenating agent, thus to produce tert.-butyl glycidyl ether; and
3. separating the glycidyl ether from the remaining halohydrin ethers and recycling the latter to Step (1).

3,878,228

STEPS FOR THE PREPARATION OF 9α-FLUORO-16-METHYLENE-PREDNISOLONE OR -PREDNISONONE AND 21-ESTERS THEREOF

Klaus Irmscher; Fritz Von Werder; Karl-Heinz Bork, and Hans-Guenther Kraft, all of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

Continuation-in-part of Ser. No. 851,723, Aug. 20, 1969, Pat. No. 3,718,542. This application Feb. 26, 1973, Ser. No. 335,735
Int. Cl. C07c *167/24*
U.S. Cl. 260—397.45 **1 Claim**

1. In a process for the production of 9α-fluoro-16-methylene-prednisolone-21-acetate, the improvement comprising the step of reacting 9α-fluoro-16-methylene-1,4-pregnadiene-11β, 17α-diol-3,20-dione with iodine in an alkaline solution, and thereafter with an alkali acetate.

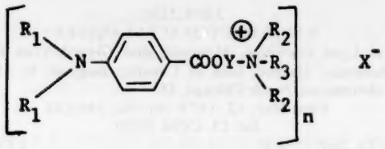
3,878,229

SUN-SCREENING COMPOUNDS III

Albert Frederick Strobel, Delmar, N.Y., assignor to GAF Corporation, New York, N.Y.

Filed Apr. 29, 1974, Ser. No. 465,259
Int. Cl. C11c *3/00*
U.S. Cl. 260—404.5 **20 Claims**

1. A compound of the formula:



wherein R_1 and R_2 are independently straight or branched chain lower alkyl; Y is $C_2 - C_6$ alkylene; R_3 is alkyl of 8 to 18 carbon atoms; X is an anion selected from the group consisting of halide, sulfate, phosphate, p-(lower alkyl) benzene sulfonate, benzoate, $R_4—COO^-$, $HOOC—R_5—COO^-$ or $^-OOC—R_5COO^-$, where R_4 is alkyl of 1 to 18 carbon atoms and R_5 is alkylene of 1 to 18 carbon atoms; and n is 1 or 2 to provide an electrically neutral compound.

3,878,230

PROCESS FOR THE PREPARATION OF ENOL ESTERS OF STRAIGHT CHAIN CARBOXYLIC ACIDS

Edward S. Rothman, North Hills, and Samuel Serota, Philadelphia, both of Pa., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 176,735, Aug. 31, 1971, Pat. No. 3,745,195. This application Dec. 15, 1972, Ser. No. 315,732
Int. Cl. C07c *67/04*
U.S. Cl. 260—410.9 N **3 Claims**

1. A process for preparing enol esters of from 5 to 23 carbon atoms comprising reacting a member of the group consisting of saturated and unsaturated straight chain carboxylic acids having from 2 to 20 carbon atoms and mixtures of said carboxylic acids with a mixture of methylacetylene and allene in the presence of a catalyst consisting of a mixture of zinc stearate and potassium stearate, said mixture cofunctioning synergistically and effecting a complete consumption of said mixture of methylacetylene and allene and forming an isopropenyl ester.

3,878,231

ACYLATION OF SYMMETRICAL DIGLYCERIDES WITH FATTY ACID ANHYDRIDE

James Harwood, Tulsa, Okla., assignor to SCM Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 171,020, Aug. 11, 1971. This application Nov. 12, 1973, Ser. No. 414,679
Int. Cl. C11c *3/00*; A23d *5/00*
U.S. Cl. 260—410.7 **2 Claims**

1. A solvent-free, non-catalytic acylating process for converting a symmetrical 1,3-diglyceride having a secondary hydroxyl into a stereospecific triglyceride, comprising:

providing a symmetrical 1,3-diglyceride having identical fatty acid radicals on the glyceride and selected from stearic fatty acid and palmitic fatty acid;

mixing prior to heating said symmetrical 1,3-diglyceride with a molar excess of fatty anhydride selected from stearic anhydride, palmitic anhydride, and oleic anhydride;

moderately heating said mixture at about 70°C to form a liquid phase reaction mixture;

heating said liquid mixture at temperatures between about 70°C and 200°C for time sufficient to substantially completely acylate said secondary hydroxyl with said fatty anhydride to form a stereospecific triglyceride.

3,878,232

EXTRACTION PROCESS TO IMPROVE THE QUALITY AND YIELD OF CRUDE VEGETABLE OILS

Lester P. Hayes, and Ross P. Simms, both of Decatur, Ill., assignors to A. E. Staley Manufacturing Company, Decatur, Ill.

Continuation-in-part of Ser. No. 75,933, Sept. 28, 1970, Pat. No. 3,734,901. This application May 21, 1973, Ser. No. 361,918

Int. Cl. C09f *5/02;* **C11b** *1/00*

U.S. Cl. 260—412.4 **15 Claims**

1. A process for recovering a lecithin rich oil from vegetable seed material which contains lipids and substantially all of the water soluble constituents of the native seed material, said process comprising the steps of:

A. extracting lipid constituents from vegetable seed material by subjecting the seed material to a lipid extraction medium containing a hydrocarbon solvent and from about 2 to about 30 parts by weight monohydric alcohol for each 80 parts by weight hydrocarbon solvent, said extraction of lipids being conducted under conditions whereby the amount of alcohol is maintained at a level of at least 2% to about 40% by weight of the vegetable seed material dry weight and the amount of lipid constituents extracted from the seed material is at least equal to the AC 3-44 lipid content of the vegetable seed material prior to the extraction of the lipids therefrom;

B. separating the resultant lipid miscella from the vegetable seed material;

C. mixing the separated lipids of step (B) in the presence of a hydrocarbon solvent, water and alcohol to provide an admixture thereof, said admixture containing a sufficient amount of monohydric alcohol and water to provide a polar phase containing on a total weighr basis from about 40% to about 70% by weight monohydric alcohol;

D. allowing the admixture to separate into a non-polar phase containing lipid extract and a polar phase containing water-soluble extract;

E. partitioning the polar phase from the non-polar phase; and

F. recovering a lipid concentrate from the non-polar phase.

3,878,233

MONOFUNCTIONAL DIFERROCENYL COMPOUNDS

Arnold T. Nielsen, China Lake, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 27, 1972, Ser. No. 238,583

Int. Cl. C07f *15/02*

U.S. Cl. 260—439 CY **4 Claims**

1. 4,4-Diferrocenyl-1-pentanol.

3,878,234

PREPARATION OF HYDROCARBON SILANES FROM POLYSILANES

William H. Atwell, and Gary N. Bokerman, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed July 30, 1973, Ser. No. 383,758

Int. Cl. C07f *7/08, 7/12*

U.S. Cl. 260—448.2 E **6 Claims**

1. A method of reacting (1) RCl with (2) Me_xCl_ySi to produce RMe_xSiCl_{3-x}, the improvement comprising carrying out the reaction in contact with a catalytic amount of a catalyst of the group consisting of R'_3N, $R'_3N.HCl$, R'_4NCl and R'_4PCl at a temperature of from 30° to 250°C. in which

R is an alkyl radical of from 1 to 18 carbon atoms, an alkenyl radical of 2 to 18 carbon atoms, or an aralkyl radical of from 7 to 18 carbon atoms,

x is 0 to 2,

y is 1 to 3,

the sum of $x + y$ being from 1.5 to 3, all the silicon atoms in (2) being bonded to at least one other silicon atom and all the valences of the silicon atoms in (2) being satisfied by other silicon atoms, Cl or Me radicals, and

R′ is an alkyl or aralkyl radical of from 1 to 18 carbon atoms.

3,878,235

CHLORINE CONTAINING METHYLENE BRIDGED DIARYL DIISOCYANATES

Wilhelm J. Schnabel, and Maurice C. Raes, both of Branford, Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Nov. 15, 1973, Ser. No. 416,042

Int. Cl. C07c *119/04*

U.S. Cl. 260—453 AM **2 Claims**

1. A chlorine-containing, methylene-bridged diaryl diisocyanate selected from the group consisting of orthochlorobenzyl-toluene diisocyanate and dichlorobenzyl-toluene diisocyanate.

3,878,236

SULPHONATES OF HYDROXYBUTYNYL ESTERS OF SUBSTITUTED CARBANALIC ACID

Peter Stuart Gates, Cambridge, and Geoffrey Tattersall Newbold, Saffron Walden, both of England, assignors to Fisons Limited, London, England

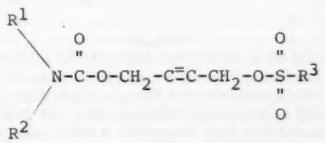
Filed June 13, 1972, Ser. No. 262,335

Claims priority, application United Kingdom, June 24, 1971, 29574/71

Int. Cl. C07c *143/02*

U.S. Cl. 260—456 A **7 Claims**

1. A compound of the formula



wherein R^1 is phenyl, which may be substituted by at least one member selected from the group consisting of a halogen atom, nitro and alkyl of 1–6 carbon atoms; R^2 is hydrogen; and R^3 is selected from the group consisting of alkyl of 1–6 carbon atoms, phenalkyl in which the alkyl group contains 1–6 carbon atoms, and chloralkyl of 1–6 carbon atoms.

3,878,237

PREPARATION OF (4-HYDROXY-3,5-DIALKYL-BENZYL) CARBOXYLIC ACID ESTERS

Heinz Eggensperger, Gadernheim Bensheim; Volker Franzen, Heidelberg; Karl-Heinz Diehl, Bensheim, and Wilfried Kloss, Kolmbach Bensheim, all of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

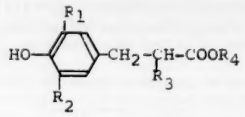
Division of Ser. No. 146,840, May 25, 1971, Pat. No. 3,830,828, which is a continuation of Ser. No. 661,191, Aug. 17, 1967, abandoned. This application Dec. 4, 1972, Ser. No. 311,543

Claims priority, application Germany, Aug. 17, 1966, 50863

Int. Cl. C07c *69/76, 121/76*

U.S. Cl. 260—465 D **5 Claims**

1. A process of preparing (4-hydroxy-3,5-dialkyl-benzyl) carboxylic acid esters of the formula



(I),

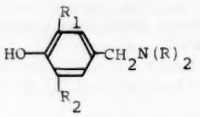
wherein

R_1 and R_2 are alkyl groups at least one of which contains 1–6 carbon atoms, and

R_3 is —CN,

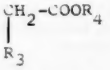
R_4 being a member of the group consisting of alkyl, thioether, and ether radicals, said radicals containing 1 to 20 carbon atoms,

comprising reacting in an anhydrous organic solvent a Mannich base of the formula



(II),

in which R is lower alkyl, with a carboxylic acid ester of the formula



(III)

R_1, R_2, R_3 and R_4 having the same significance as above in the presence of a catalytic amount of an alcoholate of a metal selected from the group consisting of alkali metal and alkaline earth metals.

3,878,238

METHOD OF PRODUCING METHACRYLONITRILE

Sekhrab Iskenderogly Mekhtiev, prospekt Lenina 90, blok 6, kv. 60; Mark Alexandrovich Dalin, prospekt Kirova, 21, kv. 41; Ramis Abdurab Ogly Polchaev, ulitsa 947, 3, kv. 4, and Rufat Gadzhibala Ogly Mamedov, 4 mikroraion ulitsa Pishevari, 29a, kv. 60, all of Baku, U.S.S.R.

Filed Nov. 8, 1973, Ser. No. 414,106

Int. Cl. C07c *121/02*

U.S. Cl. 260—465.3 **2 Claims**

1. In the method of producing methacrylonitrile comprising catalytically reacting isobutylene and ammonia in the presence of air oxygen to form a mixture comprising methacrylonitrile, acetonitrile, hydrocyanic acid and unreacted ammonia and subsequently neutralizing the unreacted ammonia, the improvement comprising treating the neutralized mixture with an equimolar amount of acetone based on the hydrocyanic acid at a temperature of 0°–50°C in the presence of an alkali metal hydroxide to form acetone cyanohydrin, reacting the acetone cyanohydrin without separation from the reaction mixture with phosphoric anhydride in the presence of a polar organic base at a temperature of 0°–35°C with the molar ratio of acetone cyanohydrin: phosphoric anhydride: polar organic base being 1:1.5 – 3:2–6; and isolating the methacrylonitrile.

3,878,239

PROSTAGLANDIN D COMPOUNDS PRODUCTION

Masaki Hayashi, and Tadao Tanouchi, both of Osaka, Japan, assignors to Ono Pharmaceutical Co., Ltd., Osaka, Japan

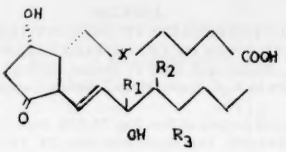
Filed May 1, 1973, Ser. No. 356,248

Claims priority, application Japan, May 9, 1972, 47-45794

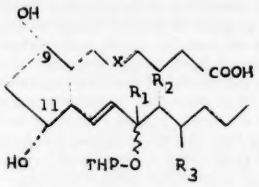
Int. Cl. C07c *01/36*

U.S. Cl. 260—514 D **4 Claims**

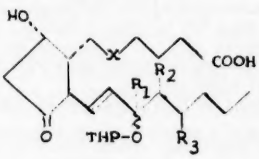
1. A process for producing a compound of the formula:



wherein X is $-CH_2CH_2-$ or cis—CH=CH—, and R_1, R_2 and R_3 are each hydrogen or one or two of R_1, R_2 and R_3 are methyl and the remainder are hydrogen, which comprises oxidizing with a member selected from the group consisting of chromic acid and Jones reagent at a temperature of about 10° to −50° C, the hydroxy radical in the 11-position of a compound of the formula:



wherein X R_1, R_2 and R_3 are as hereinbefore defined, and THP represents a 2-tetrahydropyranyl group, and hydrolyzing in a aqueous acid a temperature of less than 45° C the resulting compound of the formula:



and separating, the desired compound from the reaction mixture.

3,878,240

PREPARATION OF 2 ALKOXY-5-ALKYLSULPHONYL-BENZOIC ACIDS

Fred Kuenzy, Pully, Switzerland, assignor to Renfag S.A., Cologny-Geneva, Switzerland

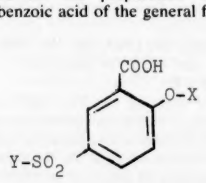
Filed Dec. 18, 1972, Ser. No. 315,842

Claims priority, application Switzerland, July 19, 1972, 10803/72

Int. Cl. C07c *147/06*

U.S. Cl. 260—521 S **1 Claim**

1. A method for the preparation of a 2-alkoxy-5-alkylsulphonyl-benzoic acid of the general formula



where X and Y are alkyl radicals with from 1 to 4 carbon atoms, comprising: alkylating o-cresol with an alkylating agent selected from the group consisting of alkylsulphates, alkylhalides and alkylarylsulphates to produce an o-alkoxycresol; brominating the o-alkoxycresol to a 2-alkoxy-5-bromotoluene; reacting the 2-alkoxy-5-bromotoluene with a

mercaptide to give a 2-alkoxy-5-alkylthio-toluene; and then the 2-alkoxy-5-alkylthio-toluene is oxidised with a first oxidising agent, potassium bichromate, to 2-alkoxy-5-alkylsulphonyl-toluene, and the 2-alkoxy-5-alkylsulphonyl-toluene is then oxidised with a second oxidising agent, potassium permanganate, to 2-alkoxy-5-alkylsulphonyl-benzoic acid.

3,878,241

METHOD FOR THE SEPARATION OF ACETIC ACID BY EXTRACTIVE RECTIFICATION

Wolfgang Muller, Marl, Germany, assignor to Chemische Werke Huls AG, Marl, Germany

Filed Jan. 11, 1973, Ser. No. 322,699

Claims priority, application Germany, Jan. 15, 1972, 2201827

Int. Cl. C07c *51/48*

U.S. Cl. 260—541 **7 Claims**

1. In the method for separating by extractive rectification acetic acid from aqueous mixtures thereof prepared by the oxidation of hydrocarbons or acetaldehyde, said aqueous mixtures containing about 3 to 80 percent by weight of acetic acid, the improvement comprising subjecting said aqueous mixtures to extractive rectification with 1,2-dimorpholinoethane as the extractant in a first step in a first rectification column and subsequently, in a second step, separating said acetic acid from said 1,2-dimorpholinoethane by rectification in a second rectification column.

3,878,242

PROCESS FOR THE PRODUCTION OF TRIHALOGENOMETHYL BENZENE SULPHONIC ACID HALIDES

Jan Hempel, Leverkusen, and Erich Klauke, Odenthal-Hahnenberg, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 20, 1970, Ser. No. 82,507

Claims priority, application Germany, Oct. 29, 1969, 1954448

Int. Cl. C07c *143/40*

U.S. Cl. 260—543 R **2 Claims**

1. Process for preparing trihalogenmethyl benzene sulfonic acid halides which comprises reacting a trihalogenomethyl benzene selected from the group of trifluoromethyl benzene, difluorochloromethyl benzene, 1-chloro-2-trifluoromethyl benzene, 1-chloro-4-trifluoromethyl benzene, 1,3-dichloro-4-trifluoromethyl benzene and 1,3-dichloro-2-trifluoromethyl benzene with a halogenosulfonic acid having the formula

Hal SO_3H

where Hal is a halogen atom, at a temperature of from −50° to 80°C in the presence of at least the stoichiometrically necessary quantity of sulfur trioxide in the form of 20 to 65 percent by weight oleum.

3,878,243

PROCESS FOR PREPARING PERCHLOROMETHYLMERCAPTANE

Boris Zupancic, Ljubljana, Yugoslavia, assignor to LEK tovarna farmacevtskih in kemicnih izdelkov, Ljubljana, Yugoslavia

Filed Oct. 3, 1973, Ser. No. 403,302

Claims priority, application Yugoslavia, Oct. 23, 1972, 2635/72

Int. Cl. C07c *145/00*

U.S. Cl. 260—543 H **8 Claims**

1. A process for preparing perchloromethylmercaptane which comprise reacting carbon disulphide and chlorine in homogeneous mixture and in the presence of an effective catalytic amount of a lead salt catalyst wherein said lead salt is soluble in carbon disulphide and thereby preparing perchloromethylmercaptane.

3,878,244

PROCESS FOR THE PRODUCTION OF TEREPHTHALIC ACID DICHLORIDE

Hans Zengel, Kleinwallstadt; Dieter Frank, Elsenfeld, and Manfred Bergfeld, Erlenbach, all of Germany, assignors to Akzo N.V., Arnhem, Netherlands

Filed Sept. 27, 1973, Ser. No. 401,536

Claims priority, application Germany, Sept. 29, 1972, 2247788

Int. Cl. C07c *51/50, 63/30*

U.S. Cl. 260—544 M **11 Claims**

1. A process for the production of terephthalic acid dichloride which comprises reacting a mixture of polyethylene terephthalate and terephthalic acid with chlorine gas at a temperature of about 150°C. to 350°C., said mixture containing about 0.1 mol up to about one mol of terephthalic acid per mol of the recurring ethylene-terephthaloyl unit of the polyethylene terephthalate and the molar ratio of said chlorine to the sum of said terephthalic acid and said ethylene-terephthaloyl units being in the range of 3:1 to 10:1.

3,878,245

PROCESS FOR THE MANUFACTURE OF PHOSPHORUS-CONTAINING CONDENSATION PRODUCTS, THE PRODUCTS AND THEIR USE AS FLAMEPROOFING AGENTS

Hermann Nachbur, Dornach, and Arthur Maeder, Therwil, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed Aug. 31, 1972, Ser. No. 285,295

Claims priority, application Switzerland, Sept. 10, 1971, 13305/71

Int. Cl. C07c *127/00*

U.S. Cl. 260—553 R **8 Claims**

1. Process for the manufacture of water-soluble condensation products from tetrakis-(hydroxymethyl)-phosphonium compounds and urea, comprising in that 1 mole of a tetrakis-(hydroxymethyl)-phosphonium hydroxide or salt selected from the group consisting of formate, acetate, phosphate, sulphate and halide, is condensed with 0.02 to 0.2 mole of urea at 40° to 120°C, in the presence of an aqueous medium or organic solvent or in the melt.

3,878,246

PROCESS FOR PRODUCING FLUORINATED ORGANIC COMPOUNDS CONTAINING A DIFLUOROMETHYLENE GROUP FROM COMPOUNDS COMPRISING AT LEAST ONE CARBONYL FUNCTION

Francois Mathey, and Jean Bensoam, both of Ballancourt, France, assignors to Institut National de Recherche Chimique Appliquee, Paris, France

Filed Sept. 30, 1971, Ser. No. 185,362

Claims priority, application France, Oct. 15, 1970, 70.37317

Int. Cl. C07c *17/18*

U.S. Cl. 260—653.8 **9 Claims**

1. Process for fluorinating a carbonyl organic compound containing at least one ketone or aldehyde group, comprising: reacting substantially anhydrous molybdenum hexafluoride as fluorinating agent with said organic compound, said organic compound being substantially anhydrous, in solution in an inert organic solvent in a glass vessel at a temperature of about −20°C to about +40°C under atmospheric pressure and under an inert atmosphere to replace the oxygen of the ketone or aldehyde group with two fluorine atoms, the molar ratio of MoF_6 to said ketone or aldehyde group being no greater than about 1:1.

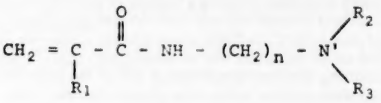
3,878,247

PREPARATION OF N-(TERTIARYAMINOALKYL) ACRYLAMIDES

Philip Hotchkiss Moss, and Robert Malone Gipson, both of Austin, Tex., assignors to Jefferson Chemical Company, Inc., Houston, Tex.

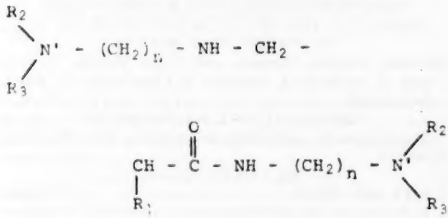
Filed Jan. 25, 1974, Ser. No. 436,467
Int. Cl. C07c *103/64*
U.S. Cl. 260—561 N 8 Claims

1. An improved noncatalytic process for the preparation of N-(tertiaryaminoalkyl)acrylamides of the formula



wherein R_1 is H or methyl; n is an integer from 2 to 6; and R_2 and R_3, taken singly are lower alkyl groups containing 1 to 4 carbon atoms or R_2 and R_3, taken jointly are combined with the N′ atom to form a heterocyclic group selected from the group consisting of morpholine, pyrollidine or piperidine ring groups; which process comprises:

subjecting a β-aminopropionamide of the formula



wherein R_1, n, R_2 and R_3 are same as above, to a temperature of about 180°C. to about 300°C. in the absence of a catalyst; and

separating the resultant product N-(tertiaryaminoalkyl) acrylamide compound.

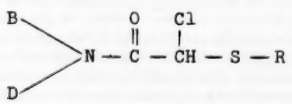
3,878,248

SUBSTITUTED ALPHA, ALPHA-DICHLORO-METHANE-ULFENYL CHLORIDES

Wendell Gary Phillips, Olivette, Mo., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 139,976, May 3, 1971, Pat. No. 3,770,824. This application Apr. 13, 1973, Ser. No. 351,046
Int. Cl. C07c *103/30*
U.S. Cl. 260—558 S 12 Claims

1. A compound of the formula



wherein R is methyl or benzyl, B is alkoxyalkyl of from 2 to 6 carbon atoms and D is alkoxyalkyl of from 2 to 6 carbon atoms or di-substituted phenyl, the two ring substituents thereof being alkyl of from 1 to 6 carbon atoms.

3,878,249

PROCESS FOR PRODUCING METHACROLEIN

Georges Gobron; Claude Falize, and Henri Dufour, all of Melle (Deux-Sevres), France, assignors to Rhone-Progil, Courbevoie, France, by said Dufour

Filed Aug. 13, 1969, Ser. No. 849,886
Claims priority, application France, Sept. 23, 1968, 68.493
Int. Cl. C07c *47/20*
U.S. Cl. 260—601 R 16 Claims

1. A process for producing methacrolein comprising the step of reacting isobutyraldehyde with an oxygen-containing gas selected from the group consisting of air and air or oxygen diluted with an inert gas in the presence of a silver catalyst deposited on a silica carrier at a temperature within the range of 150°–300°C and separating the methacrolein produced.

3,878,250

METHOD OF PREVENTING THE POLYMERIZATION OF METHACROLEIN

Ryozi Sato, Yokohama; Yasoyoshi Chinu, Tokyo, and Tatuo Endo, Yokohama, all of Japan, assignors to The Japanese Geon Company, Ltd., Tokyo, Japan

Filed Aug. 30, 1971, Ser. No. 176,333
Claims priority, application Japan, Aug. 31, 1970, 45-75596
Int. Cl. C07c *47/20*
U.S. Cl. 260—601 R 4 Claims

1. A method of preventing the polymerization of methacrolein, which comprises adding thereto, as a polymerization inhibitor, the combination of (i) at least one phosphoric acid compound selected from the group consisting of hypophosphorus acid, phosphorous acid, diphosphorous acid, isohypophosphoric acid, orthophosphoric acid, pyrophosphoric acid, metaphosphoric acid and polyphosphoric acid and (ii) tert.-butyl catechol, the amount of (i) and (ii) being 0.001–2.0 percent by weight based on the weight of said methacrolein and the weight ratio of said phosphoric acid compound to tert.-butyl catechol being 1.1:0.1–2.0.

3,878,251

(1S,2S,5S)-2-HYDROXY-5-(6-METHOXY-2-NAPHTHYL-ALPHA, ALPHA, 1-TRIMETHYLCYCLOPENTANEETHANOL

Leland J. Chinn, Morton Grove, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Filed June 18, 1973, Ser. No. 370,837
Int. Cl. C07c *43/20*
U.S. Cl. 260—613 R 1 Claim

1. (1S,2S,5S)-2-hydroxy-5-(6-methoxy-2-naphthyl)-α,α,1-trimethylcyclopentaneethanol.

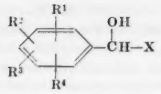
3,878,252

RING SUBSTITUTED BETA-HYDROXY-PHENYETHYLMETHYL SULPHONE OR SULPHOXIDE

Ronald M. Cresswell, Raleigh, and John W. Mentha, Washington, both of N.C., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Division of Ser. No. 75,276, Sept. 24, 1970, abandoned, which is a continuation-in-part of Ser. No. 16,605, March 4, 1970, abandoned. This application Aug. 9, 1972, Ser. No. 279,260
Int. Cl. C07c *147/06*
U.S. Cl. 260—607 A 26 Claims

1. The compound



where X is $-CH_2SO_2CH_3$ or $-CH_2SOCH_3$ and where $R^1 - R^4$ are the same or different and each is hydrogen, halogen, loweralkyl, lower alkoxyl, benzyloxy, wherein the lower alkyl and lower alkoxyl contain 1 to 4 carbons, provided that at least one of $R^1 - R^4$ is always a substitutent selected from the above definition other than hydrogen.

3,878,253

PROPADIENYLINDANOL

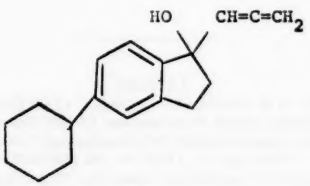
Paul L. Anderson, Dover, N.J., assignor to Sandoz-Wander, Inc., Hanover, N.J.

Filed Dec. 28, 1973, Ser. No. 429,400

Int. Cl. C07c *33/06*

U.S. Cl. 260—618 F **1 Claim**

1. The compound of the formula:



3,878,254

6-ISOFORMYL-3,4-XYLENOL AND A PROCESS FOR ITS PREPARATION

Jean Maurice Gazave, Paris, France, assignor to Marpha Societe a Responsibilite Limitee dite Societe d'Etude et d'Exploitation de Marques, Paris, France

Continuation of Ser. No. 678,429, Oct. 26, 1967, abandoned, which is a continuation-in-part of Ser. No. 326,215, Nov. 26, 1963, abandoned. This application Mar. 11, 1970, Ser. No. 18,005

Claims priority, application United Kingdom, Nov. 28, 1962, 45036/62

Int. Cl. C07c *39/12, 37/00*

U.S. Cl. 260—619 D **3 Claims**

1. 6-isobornyl-3,4-xylenol.

2. Process for preparing 6-isobornyl-3,4-xylenol and/or 6-exo-isocamphanyl-3,4-xylenol, which comprises reacting 3,4-xylenol with camphene in the presence of stannic chloride as a catalyst, at a temperature between 70° and 80° C, extracting the resulting product and collecting the fraction distillable between 203° and 223° C/200 mm. Hg., crystallizing said fraction redissolving the crystallized product in a solvent and separating the 6-isobornyl-3,4-xylenol from the 6-exoisocamphanyl-3,4-xylenol by chromatography in an alumina column.

3,878,255

PROCESS FOR PREPARING 3,5-DIALKYL PHENOLS

John R. Norell, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed June 5, 1972, Ser. No. 259,561

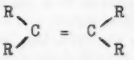
Int. Cl. C07c *37/14, 37/16, 37/18*

U.S. Cl. 260—624 R **4 Claims**

1. A process for preparing 3,5-dialkyl phenols which comprises:

a. forming a reaction mixture comprising phenol, an alkylating agent selected from the group consisting of (1) tertiary alkanols and tertiary alkyl halides having the formula

wherein X is selected from the group consisting of OH, Cl, Br or I and each R can be the same or different and is selected from straight and branch chain alkyl groups and a total number of carbon atoms in the alkanol or alkyl halide is from 4–8 and (2) olefins having the formula



wherein each R is selected from hydrogen or straight and branch chain alkyl groups and the total number of carbon atoms in the olefin is from 4–8 with the further proviso that at least two R groups on one olefinic carbon must be alkyl, and liquid hydrogen fluoride as the reaction medium at a temperature of −78°C with a mole ratio of alkylating agent to phenol ranging from 1:1 to 5:1 and a mole ratio of hydrogen fluoride to phenol in the range 0.1:1 to 2:1,

b. warming said reaction mixture to a temperature of about 25°C and allowing said phenol and said alkylating agent to react in said HF reaction medium to form a mixture of monoalkyl phenols,

c. allowing the alkylation to proceed to completion and then lowering the temperature to about −78°C and adding sufficient additional hydrogen fluoride to the reaction mixture to cause isomerization and disproportionation of the mixture of monoalkyl phenols to the 3,5-dialkyl phenols,

d. heating the reaction mixture obtained in step (c) to a temperature in the range of about 0°C to 80°C to obtain said 3,5-dialkyl phenols, and

e. recovering 3,5-dialkyl phenols thus produced.

3,878,256

STABILIZATION OF 1,1,1-TRICHLOROETHANE WITH A FOUR COMPONENT SYSTEM

Hermann Richtzenhain, Munich-Schwellenbach, and Rudolf Stephan, Troisdorf-Sieglar, both of Germany, assignors to Dynamit Nobel AG, Troisdorf, Germany

Continuation-in-part of Ser. No. 60,173, June 29, 1970, Pat. No. 3,787,509, which is a division of Ser. No. 805,923, Jan. 5, 1969, Pat. No. 3,590,088, which is a division of Ser. No. 609,681, Jan. 16, 1967, Pat. No. 3,445,532, which is a continuation of Ser. No. 316,772, Oct. 16, 1963, abandoned. This application Jan. 17, 1973, Ser. No. 324,256

Claims priority, application Germany, Oct. 18, 1962, 40087

Int. Cl. C07c *17/40*

U.S. Cl. 260—652.5 R **3 Claims**

1. A stabilized 1,1,1-trichloroethane composition consisting essentially of 1,1,1-trichloroethane, methoxyacetonitrile, nitromethane, 1,4-dioxane and 1,2 epoxybutane wherein said methoxyacetonitrile is present in an amount between 0.01 and 5.0 weight percent, said nitromethane is present in an amount

of 0.01 to 2.5 weight percent, said 1,4-dioxane is present in an amount of 0.01 to 4.0 weight percent and said 1,2-epoxybutane is present in an amount of 0.01 to 2.0 weight percent, all based upon the weight of said 1,1,1-trichloroethane.

3,878,257

CATALYTIC CONVERSION OF 1,1,2-TRICHLOROTRIFLUOROPROPENE-1 TO 2-CHLOROPENTAFLUOROPROPENE

John MacMillan Bruce, Jr., Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 10, 1973, Ser. No. 387,478
Int. Cl. C07c *17/20*
U.S. Cl. 260—653.4 **4 Claims**

1. In a catalyzed reaction at a temperature of about 400° to 600°C. of 1,1,2-trichlorotrifluoropropene-1 with hydrogen fluoride to form 2-chloropentafluoropropene, the improvement comprising employing a catalyst combination of activated anhydrous chromium (III) oxide and a divalent zinc compound.

3,878,258

PREPARATION OF CYCLODODECATRIENE

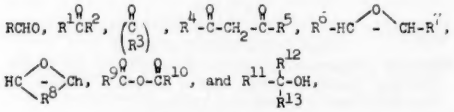
Morris Rapoport, Orange, and David Lee Sullivan, Victoria, both of Tex., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed July 11, 1974, Ser. No. 487,812
Int. Cl. C07c *3/00*
U.S. Cl. 260—666 B **8 Claims**

1. In the process for the preparation of 1,5,9-cyclododecatriene which comprises contacting butadiene in a reactor with a catalyst system resulting from the mixing of an aluminum composition of the structure

$Z_{(2.5-3.5)}Al_2Cl_{(3.5-2.5)}$

wherein Z is selected from the group consisting of alkyl radicals containing from 2 to 4 carbon atoms and the phenyl radical; a titanium compound of the formula TiA_4 wherein A is selected from the class consisting of Cl, Br, I and OR wherein R is an organic radical of from 1 to 20 carbon atoms, in an amount such that the molar ratio of the aluminum composition to the titanium compound is maintained at from 3:1 to 30:1; and a promoter for the catalyst system wherein the promoter is selected from the group consisting of water in an amount of 0.3 to 0.9 mole per mole of aluminum composition, oxygen in an amount of 0.1 to 0.7 mole per mole of aluminum composition and oxygen-containing organic compounds in an amount of 0.05 to 1.0 mole per mole of aluminum compound, wherein the oxygen-containing compound is selected from the group consisting of compounds of organic acids,



wherein R is hydrogen or an alkyl radical of from 1 to 15 carbon atoms, R^1 is phenyl radical or an alkyl radical of from 1 to 10 carbon atoms, R^2 is a phenyl radical or an alkyl radical of from 1 to 10 carbon atoms, R^3 is an alkylene radical of from 4 to 15 carbon atoms, R^4, R^5, R^6, R^7, R^9 and R^{10} are alkyl radicals of from 1 to 10 carbon atoms, R^8 is an alkylene radical of from 6 to 10 carbon atoms, R^{11}, R^{12} and R^{13} are alkyl groups of 1 to 10 carbon atoms and aryl and substituted aryl groups having 6 to 12 carbon atoms; at a temperature in the range of 20° to 120°C. and at a pressure of 0.5 to 50 atmospheres and recovering cyclododecatriene-1,5,9 along with by-products 1,5-cyclooctadiene and 4-vinylcyclohexene; the improvement which comprises adding an iodide-containing composition or compound selected from the group consisting of $Z_{(2.5-3.5)}Al_2I_{(3.5-2.5)}$, Z_2AlI, $ZAlI_2$ and I_2 wherein Z is selected from the group consisting of alkyl radicals containing from 2 to 4 carbon atoms and the phenyl radical, the molar ratio of iodine or iodide-containing composition or compound to aluminum composition being in the range of 0.05:10 to 5:10.

3,878,259

PROCESS FOR MANUFACTURING CUMENE

Günter Höckele, and Wilhelm Knepper, both of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed Apr. 15, 1974, Ser. No. 460,679
Claims priority, application Germany, Apr. 21, 1973, 2320385
Int. Cl. C07c *5/10, 7/00*
U.S. Cl. 260—667 **9 Claims**

1. In the process for manufacturing cumene by hydrogenating alpha-methylstyrene with molecular hydrogen in the presence of an alkalinated nickel aluminum-oxide carrier catalyst, the improvement comprising: said carrier containing calcined alkalinated aluminum oxide selected from the group consisting of kappa aluminum oxide, delta aluminum oxide and mixtures thereof and having an alkali content of about 0.1 – 5 percent by weight of alkali oxide, said calcined carrier is impregnated with nickel catalyst wherein the nickel content is about 5 – 12 percent by weight, calculated as nickel metal and based upon the total weight of said calcined carrier, and said hydrogenating is carried out at temperatures of about 60° – 160°C.

3,878,260

PROCESS FOR PRODUCING CONJUGATED DIOLEFINS

Taiseki Kunugi; Kaoru Fujimoto, and Hiroaki Takashima, all of Tokyo, Japan, assignors to Taiseki Kunugi, Tokyo, Japan

Filed Aug. 27, 1973, Ser. No. 391,932
Claims priority, application Japan, Aug. 30, 1972, 47-86245
Int. Cl. C07c *5/18*
U.S. Cl. 260—680 E **19 Claims**

1. A process for producing a conjugated diolefin, which comprises reacting a first reactant consisting essentially of a C_{3-8} mono-olefin having a linear chain of at least four carbon atoms with a second reactant consisting essentially of molecular oxygen at a temperature of 170°C. – 330°C. in the presence of a catalyst consisting essentially of (1) a platinum group metal catalyst and (2) a salt of an alkali or alkaline earth metal wherein an anion which constitutes said salt is an inorganic acid radical which contains an element selected from the group consisting of halogen, sulfur, nitrogen, phosphorus and boron.

3,878,261

HYDROISOMERIZATION OF PARAFFIN HYDROCARBON WITH A SUPPORTED CATALYST OF SBF_5 AND CF_3SO_3H

Lloyd E. Gardner, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

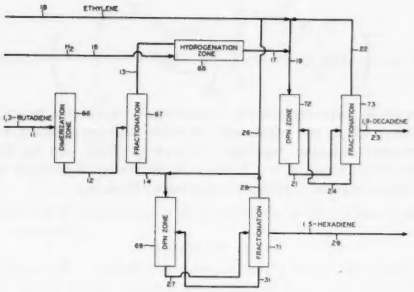
Filed Aug. 24, 1973, Ser. No. 391,477
Int. Cl. C07c *5/28*
U.S. Cl. 260—683.68 **9 Claims**

1. A method of isomerizing paraffin hydrocarbon containing from four to 12 carbon atoms which comprises passing said hydrocarbon in a feedstream into contact with a catalyst consisting essentially of SbF_5 and CF_3SO_3H on a solid support in the presence of hydrogen.

3,878,262
PREPARATION OF 1,9-DECADIENE AND 1,5-HEXADIENE

Van C. Vives, and Robert E. Reusser, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 213,928, Dec. 30, 1971, Pat. No. 3,792,102. This application Nov. 2, 1973, Ser. No. 412,335
Int. Cl. C07c *3/62, 11/12*
U.S. Cl. 260—680 R **5 Claims**



1. A process for the preparation of 1,9-decadiene and 1,5-hexadiene from butadiene, ethylene and hydrogen which comprises the steps of

a. dimerizing butadiene to provide a stream comprising 1,5-cyclooctadiene and 1,5,9-cyclododecatriene;

b. separating the stream of step (a) to provide a stream of 1,5-cyclooctadiene and a stream of 1,5,9-cyclododecatriene;

c. passing the stream of 1,5-cyclooctadiene from step (b) in the presence of hydrogen over a hydrogenation catalyst to produce a stream comprising cyclooctene;

d. disproportionating the cyclooctene of step (c) and the 1,5,9-cyclododecatriene of step (b) in the presence of ethylene to provide an effluent stream comprising unreacted cyclooctene, unreacted 1,5,9-cyclododecatriene, ethylene, 1,9-decadiene and 1,5-hexadiene;

e. separating the effluent stream of step (d) to provide an ethylene stream, a 1,9-decadiene stream, a 1,5-hexadiene stream, and a heavier stream containing cyclooctene and 1,5,9-cyclododecatriene;

f. returning the ethylene stream and heavier stream of step (e) to step (d); and

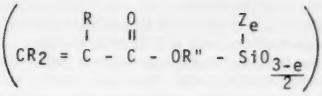
g. recovering the 1,9-decadiene stream, and 1,5-hexadiene stream of step (e) as a product of the process.

3,878,263
ACRYLATE-FUNCTIONAL POLYSILOXANE POLYMERS

Eugene Ray Martin, Onsted, Mich., assignor to Stauffer Chemical Company, Westport, Conn.

Filed July 10, 1972, Ser. No. 270,139
Int. Cl. C08g *31/22, 47/10;* **C07f** *7/18*
U.S. Cl. 260—825 **5 Claims**

1. Polysiloxane polymers of the general formula



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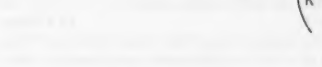


b

in which R is selected from the group consisting of hydrogen and monovalent hydrocarbon radicals having from one to 12 carbon atoms, R′ is selected from the group consisting of monovalent hydrocarbon radicals, halogenated monovalent hydrocarbon radicals or cyanoalkyl radicals having from one to 18 carbon atoms, R″ is selected from the group consisting of a divalent hydrocarbon radical having from two to 18 carbon atoms, and the corresponding divalent hydrocarbon radical containing C — O — C linkages, R‴ is a radical selected from the group consisting of $R''''O_{0.5}$, $R'SiO_{0.5}$, Z is a group selected from the class consisting of OR‴′, R‴′ or $OSiR'_3$ in which R‴′ is selected from the group consisting of hydrogen and monovalent hydrocarbon radicals, *a* and *b* are each numbers of from 1 to 20,000, *C* is a number of from 0 to 3 and *e* is a number of from 0 to 2 and when *c* is equal to 0, then at least one Z must be OR‴′, said polysiloxane polymers are obtained by equilibrating a mixture containing a silicon compound selected from the class consisting of silanes and siloxanes having acrylate and substituted acrylate-functional groups connected thereto and a cyclic organopolysiloxane in the presence of a base catalyst and an aprotic solvent.

3,878,264
MODIFIED-AMINOPLAST MOULDING COMPOSITIONS

Akira Tsukamoto, Osaka, Japan, assignor to British Industrial Plastics Limited, Manchester, England

Filed Oct. 1, 1973, Ser. No. 402,206
Claims priority, application Japan, Sept. 29, 1972, 47-97791; Sept. 29, 1972, 47-97792
Int. Cl. C08c *11/04, 11/16;* **C08g** *51/18*
U.S. Cl. 260—852 **1 Claim**

1. A modified aminoplast resin moulding composition comprising

a. an aminoformaldehyde resin;

b. a liquid rubber which is selected from the group consisting of

i. a carboxyl- or mercaptan-terminated acrylonitrile-butadiene rubber having a molecular weight of from 1,000 to 10,000, in an amount from 0.1 to 8 parts by weight per 100 parts by weight of the aminoformaldehyde resin; and

ii. a carboxyl-terminated acrylonitrile-butadiene rubber chain extended by reaction with an epoxy resin having an epoxy functionality of not more than two, said epoxy resin being present in an amount of from 5 to 100 parts by weight per 100 parts by weight of the carboxyl-terminated rubber, and said chain-extended rubber being present in an amount of from 2.5 to 20 parts by weight per 100 parts by weight of the aminoformaldehyde resin; and

c. a filler.

3,878,265

BLEND OF POLYVINYL RESIN WITH HYDROXY ALKYL ACRYLATE-CONTAINING GRAFT COPOLYMERS

Takeshi Shimamura; Tanoshi Yamagoshi, both of Niihama; Minoru Terakawa, Saijyo, and Yoshiaki Nishikubo, Niihama, all of Japan, assignors to Sumitomo Naugatuck Co., Ltd., Osaka, Japan

Division of Ser. No. 59,373, July 29, 1970, abandoned. This application July 25, 1972, Ser. No. 275,103

Claims priority, application Japan, July 29, 1969, 44-60279; Aug. 19, 1969, 44-65886

Int. Cl. C08f *15/00*, *19/00*

U.S. Cl. 260—876 R 14 Claims

1. A thermoplastic resin composition which comprises 99 to 20 parts by weight of a vinyl chloride resin having not less than 50% by weight of vinyl chloride as the main constituent and 1 to 80 parts by weight of a graft copolymer which comprises 20 to 80% by weight of one or more conjugated diolefinic polymers having not less than 50% by weight of one or more conjugated diolefinic monomers as the main constituent and 80 to 20% by weight of monomers graft polymerized thereon, the monomers comprising 0.5 to 50% by weight of at least one polymerizable carboxylic hydroxy(lower) alkyl ester monomer, 9.5 to 69.5% by weight of one or more polymerizable lower alkyl methacrylate monomers and 30 to 65% by weight of one or more polymerizable aromatic vinyl monomers.

3,878,266

POLYOLEFIN COMPOSITION RESISTANT TO HOT ALKALINE SOLUTIONS

Edward J. McInerney, Louisville, Ky., assignor to General Electric Company, New York, N.Y.

Filed Nov. 12, 1973, Ser. No. 414,915

Int. Cl. C08f *45/62*

U.S. Cl. 260—897 A 9 Claims

1. A composition having improved resistance to aging and discoloration in a high-temperature aqueous alkaline environment comprising a polymeric resinous material, a major portion of which is a moiety selected from propylene homopolymer, propylene-ethylene copolymer and propylene and ethylene polymer blends; and a stabilizer system comprising tetrakis (methylene 3-(3',5'-di-t-butyl-4'-hydroxyphenyl)propionate) methane as an antioxidant and a dialkyl tin maleate as its principal constituents, said tetrakis methane constituent being present in an amount in the range of between about 0.20 and 1.50 percent by weight and said tin maleate being present in an amount in the range of between about 0.05 and 0.25 percent by weight.

3,878,267

OXYGENATED DERIVATIVES OF S-(TERT-BUTYLTHIO)METHYL O,O-DIETHYL PHOSPHORODITHIOATE AND PHOSPHOROTHIOATE

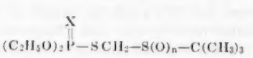
Frank Albert Wagner, Jr., Pennington, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed May 9, 1973, Ser. No. 358,756

Int. Cl. C07f *9/16*; A01n *9/36*

U.S. Cl. 260—948 4 Claims

1. A compound having the formula:



wherein X is sulfur or oxygen, and *n* is 1 and 2, with the proviso that when *n* is 1, X is oxygen.

3,878,268

ASYMMETRIC O,S-DIALKYL-O-[(PHENYL)-VINYL]-THIOPHOSPHATES

Alexis A. Oswald, Mountainside, and Paul L. Valint, Woodbridge, both of N.J., assignors to Ciba-Geigy AG, Basel, Switzerland

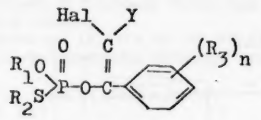
Filed June 26, 1973, Ser. No. 373,723

Claims priority, application Switzerland, June 27, 1972, 9609/72; May 16, 1973, 7060/73

Int. Cl. C07f *9/16*; A01n *9/36*

U.S. Cl. 260—957 17 Claims

1. A compound of the formula



wherein R_1 represents methyl or ethyl, R_2 represents propyl, or butyl, $(R_3)_n$ represents one or more hydrogen atoms, or represents chlorine, bromine, or methyl which can be the same or different, n is 1,2, or 3, Y represents hydrogen or chlorine, and Hal represents chlorine or bromine.

3,878,269

O-(1-HALOPHENYL-2-CHLORO)-VINYL-PHOSPHORIC ACID DIESTER-AMIDES

Wilhelm Sirrenberg, Sprockhovel; Bernhard Homeyer, Opladen; Ingeborg Hammann, Cologne, and Hans Scheinpflug, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

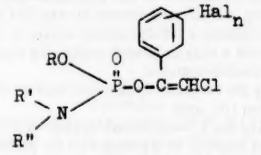
Filed Aug. 29, 1973, Ser. No. 392,723

Claims priority, application Germany, Sept. 19, 1972, 2245811

Int. Cl. C07f *9/24*; A01n *9/36*

U.S. Cl. 260—957 7 Claims

1. An 0-(1-halophenyl-2-chloro)-vinyl-phosphoric acid diester-amide of the formula



(I)

in which

R is alkyl of 1 to 12 carbon atoms, haloalkyl of 1 to 4 carbon atoms, alkenyl of 2 to 6 carbon atoms, or pheny, phenylalkyl, cycloalkyl, cycloalkenyl or cycloalkenalkyl optionally substituted by halogen or alkyl of 1 to 4 carbon atoms,

R' and R'' each independently is hydrogen, lower alkyl, alkenyl or phenylalkyl,

Hal is chlorine or bromine, and

n is an integer from 1 to 5.

3,878,270

PROCESS FOR PREPARING MIXED POLYALKYLENE GLYCOL PHOSPHORUS COMPOUNDS

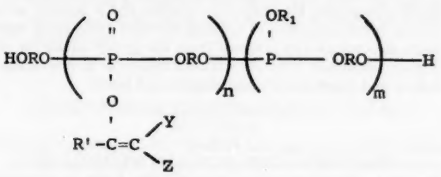
Kyung S. Shim, Irvington, N.Y., assignor to Stauffer Chemical Company, New York, N.Y.

Division of Ser. No. 166,289, July 26, 1971, Pat. No. 3,798,290, which is a continuation-in-part of Ser. No. 86,313, Nov. 2, 1970, Pat. No. 3,819,750, which is a continuation-in-part of Ser. No. 63,262, Aug. 6, 1970, abandoned. This application Aug. 20, 1973, Ser. No. 389,608

Int. Cl. C07f *9/08;* **C08g** *22/44*

U.S. Cl. 260—969 **5 Claims**

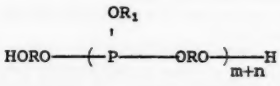
1. The process of preparing polyalkylene glycol polyphosphorus compositions characterized by OH numbers below about 150 and having the formula:



wherein R is the residue of a polyalkylene glycol having the formula:

$$HO—R''O—H$$

wherein R'' is an alkylene group having from 2 to about 20 carbon atoms, and x is an integer of from 2 to about 20; R_1 is an alkyl residue having from 1 to 10 carbon atoms; R' is selected from the group consisting of hydrogen, alkyl and haloalkyl; Y and Z are selected from the group consisting of hydrogen, halogen and alkyl; and *m* and *n* are numbers in the range from 1 to about 25 such that the sum $m + n$ is in the range from about 2 to about 50; comprising reacting (a) a polyalkylene glycol alkyl phosphate of the formula;



wherein R, R_1, *m* and *n* are as defined above with less than a stoichiometric quantity of

b. a halogenated carbonyl compound selected from the group consisting of chloral, bromal, 1,1,1-trichloroacetone, 1,1,1-tribromoacetone, hexachloroacetone, hexabromoacetone, pentachloroacetone, monochloroacetone, monobromoacetone, dichloroacetaldehyde, dibromoacetaldehyde, chloroacetaldehyde, bromoacetaldehyde, chloromethylethylketone, dichloromethylethylketone, trichloromethylethylketone, and bromomethylethylketone, at a temperature in the range from about 0° to about 150°C.

3,878,271

DEVICE FOR FEEDING THE AIR-FUEL MIXTURE TO AN INTERNAL COMBUSTION ENGINE DURING IDLING

Giampaolo Garcea, Milan, Italy, assignor to Alfa Romeo S.p.A., Milan, Italy

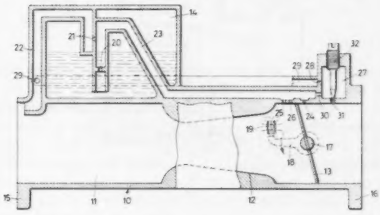
Filed May 17, 1973, Ser. No. 361,031

Claims priority, application Italy, May 17, 1972, 24491/72

Int. Cl. F02m *3/08*

U.S. Cl. 261—41 D **2 Claims**

1. A carburettor for an internal combustion engine and of the type essentially comprising at least a main system for feeding and forming a fuel/air mixture aspirated by the engine on operating at medium and high outputs, and at least one additional feeding system for the idling and accelerating operation for feeding and forming a fuel/air mixture aspirated by the engine on operating at zero and low outputs, a throttle for controlling the feeding of the engine, the output delivered by the engine being dependent on the position of said throttle, said idling and accelerating system comprising a first and a second cavity intercommunicating with each other through a calibrated port, the first cavity being in communication through a first calibrated hole with a fuel feeding duct, through at least one second calibrated hole with the ambient atmosphere and through at least one third calibrated hole with the engine inlet duct downstream of the throttle, the second



cavity being in communication through at least one fourth calibrated hole with the ambient atmosphere and at least through a manually adjustable port with the engine inlet duct downstream of the throttle, the ratio between the area of said second calibrated hole and the area of said third calibrated hole being correlated with the ratio between the area of said fourth calibrated hole and the area of said manually adjustable port such that when the area of said adjustable port assumes intermediate values in the adjustment range of the same area, the first ratio is greater than the second even when said area of the adjustable port is in the vicinity of the lower limit of said range.

3,878,272

GAS-LIQUID CONTACT APPARATUS

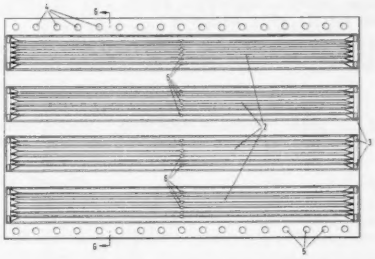
Ronald Priestley, Birmingham, England, assignor to Mass Transfer Limited, Westmoreland, England

Filed Apr. 16, 1973, Ser. No. 351,508

Claims priority, application United Kingdom, Apr. 14, 1972, 17433/72The portion of the term of this patent subsequent to Dec. 5, 1989, has been disclaimed.

Int. Cl. B01f *3/04*

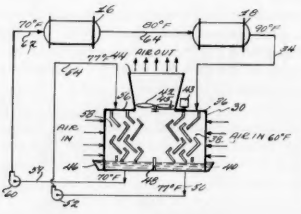
U.S. Cl. 261—112 **9 Claims**



1. A packing sheet for use in apparatus in which a film of liquid is caused to flow in contact with a gas, the sheet comprising a number of discrete spaced parallel portions each of which is shaped as a sector of a hollow corrugated tube, of which the peaks and valleys of the corrugations occur successively around the circumference of the tube, and each of the

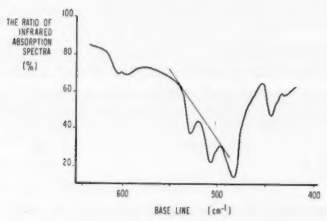
said portions being connected by substantially planar portions of said sheet.

3,878,273
PLURAL WATER/AIR CONTACT FOR COOLING WATER CYCLE
James H. Anderson, 1615 Hillock Ln., York, Pa. 17403
Filed Oct. 13, 1972, Ser. No. 297,393
Int. Cl. F28b *3/06*
U.S. Cl. 261—151 **1 Claim**



1. In a cooling water system of the kind in which a stream of cooling water is recycled between (1) a heat exchange means in which the water is heated to a generally uniform first temperature and (2) cooling means in which the water is cooled to a second generally uniform temperature by contact with ambient air under conditions of high surface area contact between water and air, the improved cooling means which comprises a plurality of water/air contacting devices disposed in a horizontal plane, at least two of said contacting devices being disposed on opposite sides of a common vertical air discharge passage, each of said two contacting devices passing a stream of ambient air into direct heat exchange contact with a stream of water flowing through the respective device and both said two contacting devices passing their air streams into said common vertical air discharge passage, and means for flowing the stream of water sequentially through said two contacting devices to cool the stream step-wise to said second temperature.

3,878,274
PROCESS FOR PRODUCTION OF POLYVINYLIDENE FLUORINE RESIN FILM
Naohiro Murayama, and Takao Oikawa, both of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed July 21, 1972, Ser. No. 273,916
Claims priority, application Japan, July 20, 1971, 46-53600; July 21, 1971, 46-53919
Int. Cl. B29d *7/24*
U.S. Cl. 264—2 **5 Claims**



1. A process for the production of a vinylidene fluoride resin film useful in electric uses, which comprises extruding and winding a sheet of polyvinylidene fluoride resin under conditions to produce an extruded sheet having a birefringent index between 1.5×10^{-3} and 30×10^{-3} and then uniaxially stretching said extruded sheet of polyvinylidene fluoride resin in the direction which is 5° to 90° from the direction of winding in the extruding step.

3,878,275
METHOD OF MAKING SPENT NUCLEAR FUEL SHIPPING CASKS
Alvin H. Kasberg, Murrysville, Pa., assignor to Atlantic Richfield Company, New York, N.Y.
Division of Ser. No. 160,498, July 7, 1971, Pat. No. 3,781,184.
This application Oct. 3, 1973, Ser. No. 402,932
Int. Cl. G21c *21/00*
U.S. Cl. 264—.5 **4 Claims**

1. A method of making a gamma and neutron radiation shield comprising blending UH_3 powder and a powder of a ductile metal incapable of forming hydrides and having high thermal conducitivity selected from the group consisting of copper, aluminum, lead and mixtures thereof in an inert atmosphere and mechanically compacting said blend.

3,878,276
CELLULOSE ACETATE BLEND MEMBRANES
Donald L. Hoernschemeyer, West Covina, Calif., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.
Filed May 24, 1972, Ser. No. 256,501
Int. Cl. B01d *13/04*
U.S. Cl. 264—41 **7 Claims**

1. In a process for the preparation of a reverse osmosis membrane consisting of

preparing a solution of cellulose acetate in an organic solvent, said cellulose acetate having an acetyl content in the range of 41.5 to 42.7 percent by weight of the cellulose acetate,

casting said solution as a thin film,

allowing the solvent to partially evaporate from said film,

immersing said film in cold water to obtain a film having a swollen gel structure, and

annealing said swollen film to increase the salt rejection of said membrane;

the improvement comprising:

incorporating an ether alcohol from the group consisting of 2-methoxyethanol, 2-ethoxyethanol, 2-(2-methoxyethoxy) ethanol and 2-(2-ethoxyethoxy) ethanol in said solution of cellulose ester, said solution further being characterized by the absence of non-solvents and swelling agents.

3,878,277
SEAT CUSHIONS AND IN METHODS AND DEVICES FOR THEIR MANUFACTURE
Jean Velte, Brieres-les-Scelles, France, assignor to Etablissements Bertrand Faure, Puteaux, France
Filed Oct. 23, 1973, Ser. No. 408,265
Claims priority, application France, Oct. 24, 1972, 72.37677; Mar. 1, 1973, 73.07303
Int. Cl. B29d *7/20;* **A47c** *23/00*
U.S. Cl. 264—46.4 **6 Claims**

1. A method for manufacturing seat cushions, said method comprising the following steps:

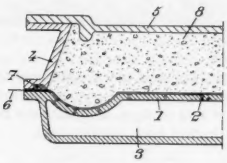
providing a mold having a bottom portion and a frame;

lining the bottom portion of said mold with a flat sheet of material, such as cloth, so that the edges of the material overhang the bottom portion of the mold;

placing the frame on the mold bottom portion lined with the sheet so as to clamp the overhanging edges of the sheet between the bottom portion and the frame;

forming a foamed block within the mold constituted by the bottom portion and the frame so that the sheet is bonded to a surface of the block;

unmolding the block;
attaching a skirt to the overhanging edges of the sheet; and
turning the attached skirt on the sides of the foamed

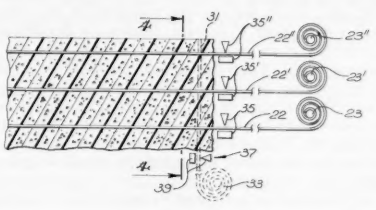


block so as to engirdle the block and hide the line of attachment between the skirt and said overhanging edges of the sheet.

3,878,278
LIGHTWEIGHT REINFORCED STRUCTURAL MATERIAL

Charles H. Miller, 54-065 Avenida Carranza, La Quinta, Calif. 92253, and Jose A. Mayrl, Centenario 122 San Pedro, Garza Garcia, N. Leon, Mexico

Filed Oct. 21, 1971, Ser. No. 191,276
Int. Cl. B29d *27/03*
U.S. Cl. 264—45.3 **23 Claims**



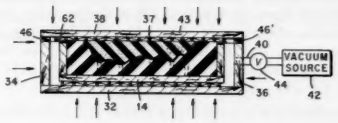
1. A method for making lightweight reinforced structural material, comprising:
combining togoether inorganic cementitious material and organic polymer foam-forming material to form a mixture thereof;
forming said mixture into a shape having a substantial length and depth dimension;
embedding in said mixture at least one reinforcing member elongate at least in said length direction and which is relatively rigid in the depth dimension of said formed mixture; and
setting said combination.

3,878,279
SYSTEM FOR THE MANUFACTURE OF FOAMED REPRODUCTIONS OF ARTICLES

Frank D. Sorrells, 5516 Timbercrest Tr., Knoxville, Tenn. 37919, and Charles A. Lee, 1216 Snowdon Dr., Knoxville, Tenn. 37918

Filed Jan. 11, 1973, Ser. No. 322,858
Int. Cl. B29c *5/00*
U.S. Cl. 264—54 **5 Claims**

1. In a method for the manufacture of a molded cellular polyurethane article employing a female mold having a cavity that is representative of the shape of said article the improvement comprising the steps of,
introducing foam-generating agents including a blowing agent and a foamable resin into said mold cavity,
disposing said mold in a suction box, having an outlet therein and wall means adapted to yieldably support a cover for said suction box,
positioning a cover over said suction box in gas-tight sealing engagement with said box wall means and spaced apart from said mold,
applying suction to said suction box through said outlet to develop a pressure differential between the interior and exterior of said suction box whereby said mold cavity is substantially evacuated of any gas initially present therein



and said cover over said suction box overcomes said yieldable support therefor and is moved into less than gas-tight closing relationship to said mold, and
maintaining said applied suction for at least that period of time when said foam-generating agents are active whereby any gas generated during the generation of the foam and which escapes from said foam and into said mold cavity is withdrawn from said mold cavity.

3,878,280
METHOD FOR PRODUCTION OF TRANSPARENT YTTRIUM OXIDE

Sunil K. Dutta, Waltham, and George A. Gazza, Sudbury, both of Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 5, 1970, Ser. No. 34,861
Int. Cl. F27d *9/04*; **C04b** *33/32*
U.S. Cl. 264—65 **6 Claims**

1. A method for the production of transparent yttrium oxide comprising the steps of:
a. selecting a yttrium oxide powder having a purity of 99.90 to 99.99%,
b. cold compressing the yttrium powder to form a compact 45–65% of theoretical density,
c. evacuating the compact at a temperature of 300°–600° C,
d. applying a pressure of 5000–7000 psi,
e. raising the temperature to 1300°–1500° C,
f. maintaining the pressure and temperature for a period of 1–2 hours, slowly cooling, and recovering transparent yttrium oxide having an ultrafine grain size of less than 1 micron.

3,878,281
PROCESS FOR THE MANUFACTURE OF INTERMEDIATES FOR THE PRODUCTION OF MOLDED ELECTRIC INSULATING ELEMENTS

Siegfried Nitzsche; Ignaz Bauer; Bernward Deubzer, and Wolfgang Seidel, all of Burghausen, Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Apr. 12, 1973, Ser. No. 350,452
Claims priority, application Germany, Apr. 12, 1972, 2217610
Int. Cl. B28d *1/32*
U.S. Cl. 264—86 **5 Claims**

1. An improved method for preparing intermediate products for manufacturing electric insulating molded forms in which an aqueous suspension containing mica having laminating characteristics and thermosetting organopolysiloxane resin particles having a diameter up to about 0.5 cm. and which are solid at ambient temperature is applied to a shaping support, said resin particles are present in an amount of from 2 to 20 percent by weight based on the total weight of the organopolysiloxane resin and mica, water is removed by mechanical means and the form thus formed is removed from the support and dried, the improvement which comprises heating the form after removing the water by mechanical means and

prior to removing the form from the support on which it was formed to a temperature between the softening point of the organopolysiloxane resin and 99°C. for from 0.1 to 60 seconds.

3,878,282

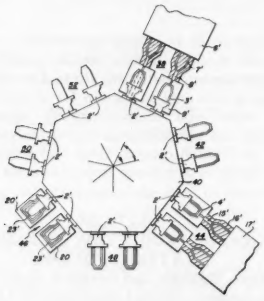
PROCESS FOR MOLDING MULTILAYER ARTICLES

Lazlo J. Bonis, Brookline, and Ralph J. Abramo, Holliston, both of Mass., assignors to Ilikon Corporation, Natick, Mass.

Continuation-in-part of Ser. No. 170,556, Aug. 10, 1971, abandoned. This application Aug. 3, 1973, Ser. No. 385,595

Int. Cl. B29c *17/07, 25/00;* **B29f** *1/10*

U.S. Cl. 264—97 **7 Claims**



1. A process for molding multi-layer plastic articles formed from at least two thermoplastic materials which comprises the steps of:

a. providing a first injection mold about a mandrel;

b. thereafter injecting a first heat-plasticized thermoplastic material into said mold and onto said mandrel to form a first parison;

c. thereafter withdrawing said mandrel and first parison from said first injection mold after the parison is formed;

d. thereafter cooling at least a portion of said parison on which a second layer is to be injected, to a temperature below the normal working range of said first thermoplastic material in order to prevent erosion of the first parison by subsequent injection of a second layer thereon;

e. thereafter providing a second injection mold about said mandrel and first parison;

f. thereafter injecting a heat-plasticized thermoplastic material onto said first parison to form a second layer parison;

g. thereafter transferring said second layer parison on said mandrel to a blow mold;

h. thereafter blow molding said second layer parison in said blow mold to form an article; and

i. thereafter removing said article from said mandrel.

3,878,283

METHOD OF MAKING MENSTRUAL NAPKINS

John Leslie Jones, Sr., 1070 Glen Oaks Blvd., Pasadena, Calif. 91105

Continuation-in-part of Ser. No. 67,593, Aug. 27, 1970, abandoned, which is a division of Ser. No. 720,500, April 11, 1968, Pat. No. 3,532,097. This application Aug. 30, 1972, Ser. No. 284,982

Int. Cl. A61f *13/18;* **B32b** *31/08, 31/18*

U.S. Cl. 264—152 **4 Claims**

1. A method for manufacturing menstrual napkins comprising: continuously combining moving equal-width plies of tissue paper to form a web having multiple confronting planar plies, simultaneously across the width of said web cutting through all said plies in plural locations to form plural separate multiple-layer napkins in side-by side relationship while simultaneously forming, in each of said napkins, plural apertures, each of said aperatures having associated therewith a single leaf-detent having plural substantially coaxial confronting tissue layers and injecting a measure volume of a hot melt

adhesive into each of said plural apertures and cooling said adhesive in said apertures to provide plural adhesive plug bonds in each of said napkins, said adhesive being adapted to be tack free at human body temperature.

3,878,284

PROCESSES FOR MAKING SHAPED ARTICLES SUCH AS FILAMENTS OR FILMS FROM SOLUTIONS OF POLYGLYCOLIC ACID

Edward E. Schmitt, Norwalk, Conn., and William J. Bailey, Hyattsville, Md., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 171,320, Aug. 12, 1971, Pat. No. 3,737,440, which is a continuation-in-part of Ser. No. 34,593, May 4, 1970, abandoned. This application Feb. 13, 1973, Ser. No. 332,462

Int. Cl. C08g *17/017, 17/02*

U.S. Cl. 264—184 **4 Claims**

1. A process for preparing a shaped article of polyglycolic acid which comprises extruding a solution comprising polyglycolic acid, having a crystalline melting point between about 222° and 235°C and having a degree of crystallinity not greater than about 30 percent, dissolved in hexafluoroisopropyl alcohol, in an amount varying between 0.01 and 30 percent by weight of polyglycolic acid based on the total weight of the solution, through an extrusion orifice and into a medium selected from the group consisting of a liquid coagulating bath and an inert stripping gas to form a shaped article of polyglycolic acid, treating said article to remove residual solvent, and stretching said article to orient the polyglycolic acid.

2. A process for preparing a shaped article of polyglycolic acid which comprises extruding a solution comprising polyglycolic acid, having a crystalline melting point between about 222° and 235°C and having a degree of crystallinity not exceeding about 75 percent, dissolved in hexafluoroacetone sesquihydrate, in an amount varying between about 0.01 and 40 percent by weight of said polyglycolic acid based on the total weight of the solution, through an extrusion orifice and into a medium selected from the group consisting of a liquid coagulating bath and an inert stripping gas to form a shaped article of polyglycolic acid, treating said article to remove residual solvent, and stretching said article to orient the polyglycolic acid.

3,878,285

PROCESS AND APPARATUS ARRANGEMENT FOR HIGH SPEED INJECTION MOLDING AND CURING OF LARGE, THICK CROSS-SECTION OBJECTS OF ELASTOMERIC MATERIAL

Robert David Souffie, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 180,765, Sept. 14, 1971, abandoned. This application Sept. 7, 1973, Ser. No. 395,249

Int. Cl. B29h *3/08*

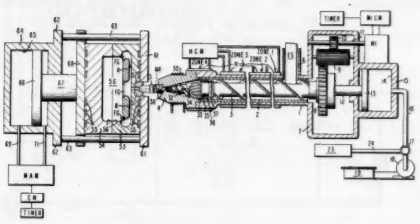
U.S. Cl. 264—329 **2 Claims**

1. A process for high speed injection-molding of elastomeric articles weighing at least four pounds and having at least one cross-sectional dimension greater than one-quarter inch, said process comprising the following sequential steps:

1. supplying at a temperature within the range of about room temperature to 150°F. at least 4 pounds of solid, uncured, precompounded, heat-curable, elastomeric stock having a minimum Mooney viscosity value, M/S, at

250°F. of about 5–60 and a Mooney scorch value of 10–40 minutes to 10-point rise to the barrel of an injection-molding machine;

2. masticating and heating the elastomeric stock in the barrel while transporting it forward by means of a screw; the barrel being heated to such a temperature that the elastomeric stock, which is heated both by the walls of the barrel and by the mastication, reaches in the forward end of the barrel a uniform temperature of about 220°–260°F.; the masticating and heating time being less than about 60 seconds;



3. forcing the elastomeric stock through a nozzle and one or more restricted passages in the mold at a sufficient pressure to heat the stock to about 320°–400°F. into a mold cavity maintained at substantially the same temperature as the incoming rubber stock, the temperature of the stock exiting from the nozzle being within the range of 270° to 300°F., and the mold filling time being less than about 30 seconds;
4. allowing the stock to remain in the mold cavity for a period of about 20–90 seconds, during which time the stock is both shaped and uniformly cured.

3,878,286

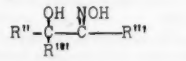
PROCESS FOR RECOVERING COPPER FROM AQUEOUS SOLUTIONS

Edmond A. Morin, Aurora, and Hal D. Peterson, Boulder, both of Colo., assignors to Colorado School of Mines Research Institute, Golden, Colo.

Filed June 25, 1973, Ser. No. 373,479
Int. Cl. B01d *15/04, 15/06*
U.S. Cl. 423—24 **20 Claims**

1. In the process for the recovery of copper values from an aqueous solution comprising the steps of

1. contacting said aqueous solution with an organic phase to extract at least a portion of the copper values in the organic phase, the organic phase comprising a liquid hydrocarbon and a hydroxyoxime having a solubility of at least 2 percent by weight in the liquid hydrocarbon selected from the class consisting of
   a. an alkyl substituted, ethylenically unsaturated substituted and alkyl or ethylenically unsaturated aliphatic ether substituted 2-hydroxy benzophenoxime, and
   b. an α-hydroxy oxime having the formula



wherein R'' and R''' are organic hydrocarbon radicals and R'''' is a hydrogen or a hydrocarbon radical;

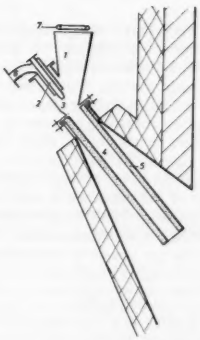
2. separating the resultant copper-pregnant organic phase and the resultant copper-barren aqueous phase; and
3. recovering the copper-pregnant organic phase;
   the improvement comprising the presence of 0.05–1.3 parts by weight per 100 parts by weight of hydroxyoxime of a sulfo compound selected from the class consisting of
   i. A dialkyl sulfosuccinate wherein said alkyl groups each have 5–30 carbon atoms;
   ii. an alkylated naphthalenesulfonic acid having 1–3 alkyl groups and a total of 8–30 carbon atoms in said alkyl groups; and
   iii. an alkyl sulfate of the formula Alkyl-OSO_2OH wherein the alkyl group has 12–30 carbon atoms;
   provided that where said sulfo compound is an alkylated naphthalene sulfonic the amount thereof may be as high as 13 parts by weight per 100 parts of hydroxyoxime.

3,878,287

CHARGING OF KILN WITH GRANULAR MATERIAL

Wolfgang Dieter Muller, Leverkusen; Ulrich Hart, and Axel Lippert, both of Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 22, 1973, Ser. No. 343,758
Claims priority, application Germany, Apr. 11, 1972, 2217299
Int. Cl. C01g *1/00;* **C22b** *1/00*
U.S. Cl. 423—153 **8 Claims**



1. In the operation of a kiln including feeding a granular material by means of a gas into said kiln, advancing said material through said kiln and removing a product from said kiln, the improvement in charging said kiln which comprises blowing feeder gas from a nozzle downwardly into a wear-resistant mixer tube at the inlet to said kiln under a pressure greater than prevails in said kiln, said nozzle being spaced from said tube, dropping said granular material about the outlet of said nozzle at a rate such that said granular material is conveyed by said gas into said tube and supplying a second material in an annular path surrounding said nozzle whereby said second material is also conveyed by said gas into said tube.

3,878,288

RECLAIMING OF LIME PLANT FINES

James A. Commins, 7708 Orchard Way, Philadelphia, Pa. 19118

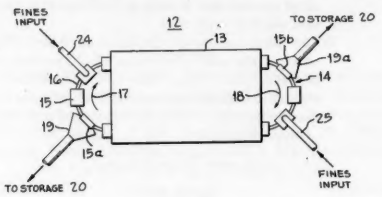
Filed Feb. 15, 1972, Ser. No. 226,504
Int. Cl. C01f *11/06*
U.S. Cl. 423—175 **3 Claims**

1. The process of treating the incompletely calcined limestone fines from a rotary kiln, comprising:

introducing said fines into a heating zone;

subjecting said fines in said zone to indirect heating, without an air blast capable of carrying said fines out of said zone,

at a temperature of approximately 1600°F and for a period of approximately 1.5 minutes; and



removing said fines from said zone after having been subjected to said heating.

3,878,289

PROCESS FOR THE REMOVAL OF HYDROGEN CYANIDE FROM GAS STREAMS

David K. Beavon, Los Angeles, Calif., assignor to The Ralph M. Parsons Company, Los Angeles, Calif.

Filed Aug. 24, 1972, Ser. No. 283,501

Int. Cl. C01c *3/04*

U.S. Cl. 423—219 **18 Claims**

1. A process for the removal of hydrogen cyanide from gas streams which comprises contacting the gas stream in the presence of water in an amount at least sufficient to hydrolyze the contained hydrogen cyanide with a catalyst consisting of at least one alkali metal hydroxide deposited on a support selected from the group consisting of alumina, silica, alumina-silica and the zeolites in which the alkali metal hydroxide deposited on the support as alkali metal is present in an amount of from about 0.1 to about 10 percent by weight based on the total weight of the alkali metal and the support at a temperature of from about 200°F to about 800°F for a time sufficient to hydrolyze a substantial quantity of the hydrogen cyanide present in the gas stream to ammonia.

3,878,290

DIVALENT METAL SALTS OF DODECARHODIUM-TRIACONTA CARBONYLS

Wellington E. Walker, Charleston; Earle S. Brown, South Charleston, and Roy L. Pruett, Charleston, all of Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed June 19, 1973, Ser. No. 371,354

Int. Cl. C01f *13/00;* **C01g** *55/00, 1/04*

U.S. Cl. 423—249 **21 Claims**

1. Rhodium carbonyl salts of the formula

$$M[Rh_{12}(CO)_{30}]$$

wherein M is a divalent metal cation selected from the group consisting of beryllium, magnesium, calcium, strontium, radium, scandium, yttrium, manganese, iron, ruthenium, rhenium, cobalt, nickel, palladium, platinum, zinc, cadmium, mercury, cerium, and europium.

3,878,291

PROCESS FOR THE PRODUCTION OF METAL FREE CHLOROSILANE BY THE CHLORINATION OR HYDROCHLORINATION OF FERROSILICON

Rudolf Keller, Ziegelhausen Uber Heidelberg; Hans Klebe, and Heinz-Rudiger Vollbrecht, both of Rheinfelden, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt am Main, Germany

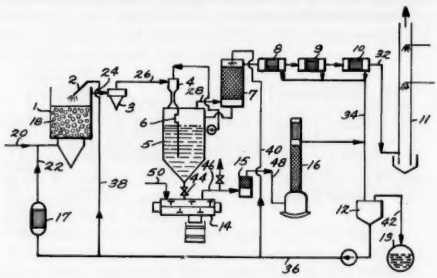
Filed Oct. 4, 1972, Ser. No. 294,924

Claims priority, application Germany, Dec. 11, 1971, 2161641

Int. Cl. C01b *33/08;* **C01f** *7/56;* **C01g** *49/10*

U.S. Cl. 423—341 **15 Claims**

1. A process for the production (1) silicon tetrachloride, (2) a mixture of silicon tetrachloride with a minor amount of silicochloroform, or (3) a mixture of silicon tetrachloride with a minor amount of both silicochloroform and dichlorosilane free of iron, aluminum and titanium which comprises reacting lumpy ferrosilicon with chlorine or hydrogen chloride as the chlorinating agent in a closed reactor which in its lower portion has support means for the ferrosilicon and a chlorinating agent inlet and its upper portion a ferrosilicon inlet and a reaction gas outlet, holding the temperature in the top space of the reactor below the sublimation temperature of iron



chloride by spraying in pure liquid chlorosilane and sending the reaction gas through said reaction gas outlet in the upper portion of the reactor to a washer pressurized with liquid chlorosilane, conducting a mixture of gas, liquid and solids leaving the washer directly to a separator for the liquid and solids charged with liquid chlorosilane, separating the liquid and solids therein, leading the separated gas through a washing column pressurized with pure chlorosilane and finally condensing pure chlorosilane.

3,878,292

MONOVALENT METAL SALTS OF DODECARHODIUMTRIACONTA CARBONYLS

Wellington E. Walker, Charleston; Earle S. Brown, S. Charleston, and Roy L. Pruett, Charleston, all of W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed June 19, 1973, Ser. No. 371,351

Int. Cl. C01g *55/00, 1/04*

U.S. Cl. 423—417 **8 Claims**

1. Rhodium carbonyl metal salts of the formula

$$M_2[Rh_{12}(CO)_{30}]$$

wherein M is a monovalent metal cation selected from the group consisting of rhodium, copper, silver, gold, iridium, indium and thallium.

3,878,293

PROCESS FOR THE PRODUCTION OF FINELY POWDERED ALUMINUM TRICHLORIDE OF UNIFORM PARTICLE SIZE

Luigi Piccolo; Antonio Paolinelli, both of Milan, and Marcello Ghirga, Bresso, all of Italy, assignors to Societa Italiana Resine S.I.R. S.P.A., Milan, Italy

Filed June 12, 1973, Ser. No. 369,381

Claims priority, application Italy, June 13, 1972, 25582/72

Int. Cl. C01f *7/58*

U.S. Cl. 423—495 **10 Claims**

1. Process for the production of finely powdered aluminum trichloride of uniform particle size of at most about 1 micron and having a bulk density of 0.35 to 0.55 Kg/dm^3 from aluminum trichloride vapour, characterized in that

a. a gas stream comprising aluminum trichloride vapour with a velocity of at least 0.5 m/sec, and

b. a cold stream of inert gas with a velocity of at least 2 m/sec are introduced into a sublimate precipitator,

the ratio of the entry flow velocities of gas stream comprising aluminum trichloride vapor: inert gas being in the range between 1 : 2 and 1 : 10, the two gas streams meeting at an angle of 20° to 50°, and the temperature of the combined gas mix-

ture is kept at 30° to 70°C to produce said finely powdered aluminum trichloride and the said solid aluminum trichloride formed is separated from the gaseous products.

3,878,294

PRODUCTION OF HYDROGEN FLUORIDE

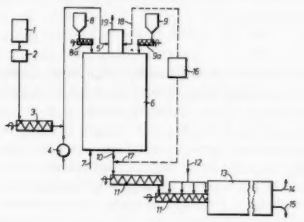
Werner Schabacher, Leverkusen; Hans Guth, Bergisch Neukirchen; Hermann Rohe, Leverkusen, and Wolfgang Keller, Bergisch Gladbach-Paffrath, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 219,376, Jan. 20, 1972, abandoned. This application Dec. 19, 1973, Ser. No. 426,423

Claims priority, application Germany, Jan. 26, 1971, 2103338

Int. Cl. C01b *7/33*; **C01f** *4/16*

U.S. Cl. 423—485 **8 Claims**



1. In the production of hydrogen fluoride and metal sulfates by reacting sulfuric acid with a preheated metal fluoride, the improvement which comprises effecting the preheating by continuously heating the metal fluoride to about 500° to 800°C in a gas/solid suspension with a gas charge of about 0.2 to 4 kg/Nm^3, the preheating being effected by directly contacting the metal fluoride in counterflow with a hot gas of a temperature from about 500° to 1,200°C in a heat exchanger having alternating constricted and widened zones thereby to form localized clouds of particles, and then reacting the preheated metal fluoride with sulfuric acid at a temperature of about 100° to 500°C.

3,878,295

METHOD OF PRODUCING HIGH DENSITY CALCIUM CHLORIDE ⅓ HYDRATE

Gerard C. Sinke, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Sept. 24, 1973, Ser. No. 400,095

Int. Cl. B01d *9/02*; **C01f** *11/24*, *11/30*

U.S. Cl. 423—497 **23 Claims**

1. A method of producing calcium chloride comprising sequentially (a) precipitating $CaCl_2.\frac{1}{3}H_2O$ from a saturated aqueous calcium chloride solution maintained within the temperature range from about 185° to about 230°C.; (b) separating the precipitated calcium chloride from the solution within the temperature range of from about 185° to about 230°C; (c) and then cooling the precipitated calcium chloride to thereby produce a calcium chloride particulate with a density greater than anhydrous $CaCl_2$.

3,878,296

REACTION OF LITHIUM CARBONATE AND FIBROUS ALUMINUM OXIDE TO PRODUCE LITHIUM ALUMINATE

Raymond W. Vine, Bolton; William J. Harrison, Rockville, and Roger C. Emanuelson, Glastonbury, all of Conn., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed Aug. 18, 1971, Ser. No. 172,658

Int. Cl. C01f *7/04*; **H01m** *11/00*

U.S. Cl. 423—600 **1 Claim**

1. The method of producing fibrous lithium aluminate comprising the steps of providing a uniform admixture of lithium carbonate and aluminum oxide fibers and heating said mixture at a temperature sufficient to convert the aluminum oxide to lithium aluminate, the ratio of aluminum oxide fibers to lithium carbonate being from 1 : 3 to 3 : 1.

3,878,297

METHODS OF RESTORING CARDIAC RHYTHM

James A. Vick, Edgewood, Md., assignor to Schuyler Development Corporation, Reading, Pa.

Filed July 2, 1973, Ser. No. 375,543

Int. Cl. A61k *17/00*

U.S. Cl. 424—98 **4 Claims**

1. A method of restoring cardiac rhythm in animals comprising the step of introducing an effective amount of apamin into the cardiovascular system of the animal being treated.

3,878,298

REACTION PRODUCT OF CHLORAL WITH MOLASSES

Roger C. Parish, King of Prussia, and John E. Trei, West Chester, both of Pa., assignors to SmithKline Corporation, Philadelphia, Pa.

Division of Ser. No. 191,813, Oct. 22, 1971, Pat. No. 3,796,797, which is a continuation-in-part of Ser. No. 881,915, Dec. 3, 1969, Pat. No. 3,615,649. This application Sept. 24, 1973, Ser. No. 400,302

Int. Cl. A61k *27/00*

U.S. Cl. 424—180 **5 Claims**

1. The product of reacting molasses with chloral in a thoroughly mixed reaction mixture with the application of heat until the odor of unreacted chloral substantially disappears.

3,878,299

PLANT EXTRACTS HAVING PERIPHERAL CORONARY DILATORY AND VASODILATORY ACTION

Pol Ghislain Vilain; Daniel Bernard Beziat; Philippe Maurice Hatinguais, and Henri Pierre Lauressergues, all of Castres, France, assignors to Investigations Scientifiques Pharmaceutiques, Castres, France

Continuation of Ser. No. 159,528, July 2, 1971. This application Jan. 7, 1974, Ser. No. 431,465

Claims priority, application France, July 23, 1970, 70.27189

Int. Cl. A61k *27/14*

U.S. Cl. 424—195 **2 Claims**

1. A method of treating animals in need of coronary dilation and vasodilation which comprises the administration to such animal of from 2 mg. to 20 mg. of the composition comprising an extract obtained by extracting the bark of the root *Poterium spinosum* with a solvent selected from the group consisting of water, methanol, N-butanol, and mixtures thereof together with a pharmaceutical carrier, said extract having a molecular weight of from 500 to 3,000.

3,878,300
TREATMENT OF FERMENTED BEVERAGES TO INCREASE CHILL HAZE STABILITY

Daniel J. Milligan, Houston, Tex., assignor to N. L. Industries, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 310,804, Nov. 30, 1972, abandoned. This application Apr. 3, 1974, Ser. No. 457,420

Int. Cl. C12h *1/04*

U.S. Cl. 426—16 **15 Claims**

1. A process of increasing the chill haze stability of fermented alcoholic beverages, which comprises the following steps in the order indicated:

a. adding to the beverage before final filtration from 50 to 500 parts per million parts of the beverage, by weight, of polysilicic acid in the form of a polysilicic acid hydrosol, wherein said polysilicic acid hydrosol is obtained by forming a silicic acid hydrosol and aging said silicic acid hydrosol for a period of time which is equal to at least 15% and less than 100% of the time for said hydrosol to obtain a viscosity of 100 centipoises measured at 25°C, and wherein said silicic acid hydrosol is formed by placing an aqueous solution of sodium silicate into intimate contact with a cation exchange resin in its hydrogen form whereby sodium ions in said silicate solution are removed by said resin and replaced with hydrogen ions from said resin;

b. aging the polysilicic acid treated beverage for a period of time sufficient to coagulate chill haze precursor substances in said beverage; and

c. separating said polysilicic acid from said beverage.

3,878,301
PROCESS FOR CONTROLLING THE PRODUCTIVITY OF MICRO-ORGANISMS

Philipp Berdelle-Hilge, 125 High St., Boston, Mass. 02110

Continuation-in-part of Ser. No. 173,932, Aug. 23, 1971, Pat. No. 3,737,323, which is a continuation-in-part of Ser. No. 758,019, Sept. 6, 1968, abandoned. This application Aug. 21, 1972, Ser. No. 282,173

Claims priority, application Germany, Aug. 23, 1971, 2142228

Int. Cl. C12c *11/14*

U.S. Cl. 426—30 **15 Claims**

1. A process for the continuous and accelerated production of alcoholic beverages comprising the steps of:

a. continuously passing a fermentable liquid substrate by means of a hydraulic pressure through at least one reaction bed layer consisting essentially of enzyme-producing micro-organisms fixedly settled in front of a filter for retaining said organisms to ferment the liquid substrate in a very short contact time of a few minutes, and to obtain an alcoholic beverage; and

b. reducing substantially temporarily occurring unintentional variations of the issuing substrates pH and fermentation rate by correspondingly varying at least one of the following parameters: the hydraulic pressure applied to the substrate and temperature of the substrate.

3,878,302
PRODUCTION OF SOY SAUCE

Anthony J. Luksas, and Wilmore Williams, both of Chicago, Ill., assignors to Beatrice Foods Co., Chicago, Ill.

Division of Ser. No. 36,427, May 11, 1970, Pat. No. 3,711,303. This application Dec. 4, 1972, Ser. No. 311,517

Int. Cl. A23l *1/20*

U.S. Cl. 426—46 **17 Claims**

1. An anaerobic to mildly aerobic fermentable composition for producing soy sauce comprising a mixture of koji or maromi with which is additionally admixed an inoculant having as the sole essential organisms of the said inoculant at least one yeast selected from the group consisting essentially of Saccharomyces, Debaryomyces, Maromi isolated yeasts and mixtures thereof, the said inoculant having a number of organisms equivalent to at least 1,000 organisms per cc of liquid to be associated with the koji in forming maromi.

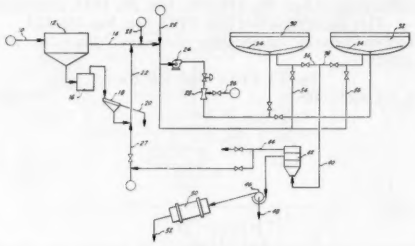
3,878,303
TREATMENT OF ANIMAL WASTES

Saburo Hashimoto, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed July 12, 1973, Ser. No. 378,523

Int. Cl. A23j *3/00*

U.S. Cl. 426—56 **5 Claims**



1. The method of aerobically converting animal wastes to protein by aerobic decomposition of said wastes which comprises admixing (1) a liquid medium rich in animal wastes containing about 1 to about 10 weight percent dissolved and suspended animal excrement, (2) an aqueous culture medium of aerobic bacteria in an amount sufficient to provide a concentration of bacteria in an aqueous medium between about 0.05 and about 2.5 weight percent, said bacteria being in an exponential growth phase and (3) a foam stabilizing additive selected from the group consisting of protective colloids and surface-active agents in an amount sufficient to reduce surface tension of said aqueous culture medium to within the range of about 15 to about 50 dynes per centimeter and combinations of said protective colloids and surface active agents, admixing the resultant liquid medium with an oxygen-containing gas under conditions sufficient to form a stable foam containing said gas as a discontinuous phase and said liquid medium as the continuous phase, and maintaining said liquid medium in a fermentation zone under quiescent conditions for a reaction period of about 3 to about 48 hours and at a temperature between about 15° and about 60°C., thus maintaining said bacteria in the exponential growth phase, said period and temperature being sufficient to substantially completely decompose said animal excrement and convert the same to said protein.

3,878,304
METHOD OF PRODUCING A PELLETED SLOW-RELEASE NPN FEED FOR RUMINANTS FROM WASTE POLYSACCHARIDE MATERIALS

William Percy Moore, Hopewell, Va., assignor to Allied Chemical Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 499,748, Aug. 22, 1974, abandoned, which is a continuation of Ser. No. 386,245, Aug. 6, 1973, abandoned, which is a continuation of Ser. No. 228,313, Feb. 22, 1972, abandoned. This application Oct. 21, 1974, Ser. No. 516,696

Int. Cl. A23k *1/14, 1/22*

U.S. Cl. 426—69 **8 Claims**

1. A process of preparing a nontoxic pelleted ruminant feed, which comprises:

a. providing an aqueous ruminant feed supplement comprising 4 to 8 parts by weight of water soluble sulfate, up to 20 parts by weight of molasses, 20 to 35 parts by weight of urea, and 10 to 25 parts by weight, on a dry basis, of an acid selected from the group consisting of superphosphoric acid and aqueous ammoniated superphosphoric

acid having a nitrogen content of about 9 to 12 percent by weight, a total phosphorus content measured as P_2O_5 of 28 to 39% by weight, and wherein polymeric phosphates represent about 30 to 70 percent by weight based on the total phosphorus content, sufficient acid being present to provide a pH no greater than about 4.8;

b. mixing said feed supplement with a solid waste or by-product carbohydrate material consisting essentialy of water-soluble and water-insoluble polysaccharides and less than 1 percent by weight of nitrogen and containing 25 to 75 weight percent of water to impregnate the solid waste or by-product carbohydrate material and provide about 2 to 10 weight percent total nitrogen on a dry basis and provide an acid catalyst for hydrolysis of the polysaccharides to form aldehydic carbonyl groups reactive to urea, said mixture having pH no greater than 6.7;

c. drying and reacting the mixture from step (b) in a conventional gas fired dryer at a temperature within the range 160°to 290°F. for 5 to 60 minutes to obtain a dried, reacted, slow-release nitrogen product containing 5 to 12 percent by weight of water;

d. grinding said dried product sufficiently to pass through a 12-mesh Tyler screen;

e. then pelleting and agglomerating said dried product at a pressure of 500–20,000 p.s.i.g. while maintaining the temperature thereof at about 140°F. to 300°F.; and

f. cooling the resulting pelleted product to ambient temperature to form hard pellets wherein 50 to 90 percent of the total nitrogen is water-insoluble nitrogen.

3,878,305

FORTIFICATION OF FOODSTUFFS WITH N-ACYL DERIVATIVES OF SULPHUR-CONTAINING L-AMINO ACIDS

Ralph Anthony Damico, and Robert Wayne Boggs, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed May 25, 1972, Ser. No. 256,860

Int. Cl. A23l *1/30, 1/00*

U.S. Cl. 426—104 **11 Claims**

1. A proteinaceous foodstuff comprising an edible sulfur-containing amino acid deficient protein and a nutritionally supplemental amount of N-acyl L-methionine, wherein the N-acyl substituent is derived from fatty acids having from 2 to 9 carbon atoms; said foodstuff being essentially free of N-acyl D-methionine.

3,878,306

IMITATION MAPLE SIRUP

George A. Garstick, 1305 Brighton N.E., Warren, Ohio 44483

Filed Oct. 11, 1972, Ser. No. 296,512

Int. Cl. A23l *1/08*

U.S. Cl. 426—658 **2 Claims**

1. An imitation maple sirup, comprising a boiled mixture of about 2 quarts of distilled water, about 5 pounds of granulated white sugar, about 1 pound of granulated light brown sugar, about 5 to 15 drops of pure lemon extract and about 30 to 90 drops of pure vanilla extract to give a final batch of about 3½ quarts of sirup.

3,878,307

PROCESS FOR PRODUCING CURED MEATS

Michael Herder Coleman, Putnoe; Roland Sydney Hannan, Pinner, and David Richard Duke Osborne, Riseley, all of England, assignors to Lever Brothers Company, New York, N.Y.

Continuation-in-part of Ser. No. 229,578, Feb. 25, 1972, abandoned. This application Jan. 7, 1974, Ser. No. 431,452

Claims priority, application United Kingdom, Mar. 2, 1971, 5823/71; Mar. 8, 1971, 6283/71

Int. Cl. A23b *1/02*

U.S. Cl. 426—266 **5 Claims**

1. In a process for producing cured meat which comprises contacting the meat with brine containing an alkali metal nitrite under conditions wherein a free nitrite content of from 10 to 80 parts per million is left in the cured meat, the improvement which comprises destroying at least the major portion of the residual free nitrite by treating said cured meat with a substance dissolved in brine that reacts with nitrite but does not significantly affect the color of said cured meat, said substance (a) containing sulphur dioxide in combined form and being selected from the group consisting of alkali metal sulphites, bisulphites and thiosulphates, and (b) being employed in an amount of from about 50 to about 500 parts by weight of combined sulphur dioxide per million parts by weight of said cured meat.

3,878,308

COCONUT TREATMENT PROCESS

John H. Forkner, Fresno, Calif., assignor to The Pillsbury Company, Minneapolis, Minn.

Filed Sept. 18, 1973, Ser. No. 398,563

Int. Cl. A23l *1/00, 1/36*

U.S. Cl. 426—323 **6 Claims**

1. A process for the treatment of fresh coconut meat that is characterized by aligned rod-like cells arranged in cell bundles comprising the steps of immersing pieces of fresh coconut in a water solution of a physiologically acceptable acid at a pH value and of a character capable of inhibiting enzymatic activity and mold formation, holding the batch at ambient temperature for a period of time sufficient to cause the acid to penetrate into the interiors of the pieces and to inhibit enzymatic activity and mold formation, and thereafter processing the coconut meat in a water solution of a physiologically acceptable acid at an elevated temperature and at a pH and for a period of time sufficient to disrupt the cells of the meat and loosening of the cells with respect to each other.

3,878,309

PEACH PITTING METHOD

Gerald R. Anderson, 1394 Arroyo Seco Dr., Campbell, and William C. Wann, Jr., 1416 Dentwood Dr., San Jose, both of Calif.

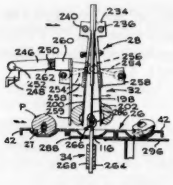
Division of Ser. No. 61,210, Aug. 5, 1970. This application Aug. 22, 1972, Ser. No. 282,810

Int. Cl. A23l *1/00*

U.S. Cl. 426—485 **5 Claims**

1. The method of pitting seamed indented fruit wherein fruits are placed in centrally apertured cups of a horizontally running conveyor, the fruits are aligned to bring their seams into a predetermined vertical plane, a lower pitting tool is projected up through each cup aperture and into the fruit, and the fruit is bisected by lowering upper blades that flank an upper pitting tool and which are above the cup and disposed in said plane; the improvement comprising the steps of lifting

the fruit from its cup by raising the lower pitting tool before the upper blades bisect the fruit, lowering the upper blades to



bisect the fruit while it is lifted from its cup, and separating the resultant fruit halves from the pit while the fruit is lifted from its cup.

3,878,310

TREATMENT OF BEVERAGES TO CLARIFY AND TO PREVENT HAZE

Nathan D. Field, Allentown; Edwin M. Smolin, Easton; Willis G. Thomas, Jr., Bethlehem, and Earl P.. Williams, Pen Argyl, all of Pa., assignors to GAF Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 736,297, June 12, 1968, abandoned. This application Apr. 15, 1971, Ser. No. 134,500

Int. Cl. C12h *1/04*

U.S. Cl. 426—422 **12 Claims**

1. A process for clarifying and improving vegetable and similar beverages which comprise contacting such a beverage with a water-insoluble, water-swellable crosslinked polymer in a porous granular or bead form wherein said polymer is selected from the group consisting of N-vinyllactam and N-alkyl-N-vinylamide polymers and said crosslinking agent contains at least two functional groups capable of taking part in the polymerization reaction to provide a crosslinked three-dimensional structure, thereafter separating the beverage from the polymer and regenerating said polymer beads by elution of any absorbate present thereon.

3,878,311
CHANNEL-TYPE ELECTRIC INDUCTION HEATING FURNACE

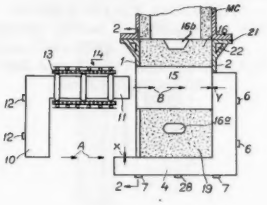
Conny Andersson, Viken, and Bengt Fredriksson, Vasteras, both of Sweden, assignors to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed Jan. 21, 1974, Ser. No. 434,888

Claims priority, application Sweden, Jan. 26, 1973, 73010829

Int. Cl. H05b *5/14*

U.S. Cl. 13—29 **8 Claims**



1. A channel-type electric induction heating furnace inductor unit comprising a frame having oppositely interspaced upstanding metal walls in which mutually registered transformer core clearance openings are formed, a transformer core having an upper horizontal portion extending transversely through said walls via said openings, said upper horizontal portion having opposite ends projecting outwardly from said walls, said frame supporting refractory between said walls and this refractory forming a metal heating channel loop around said upper horizontal portion of said core and extending upwardly therefrom, said core having a vertical portion extending downwardly from each of said opposite ends of said upper portion on the outsides of said walls and a lower horizontal portion below said channel and extending transversely between the lower ends of said vertical portions, said core portions magnetically interconnecting and said core forming a substantially closed magnetic flux path, and an electrically powered inductor coil surrounding said upper horizontal portion of said core; wherein the improvement comprises said upstanding metal walls of said frame having mutually registered lower core clearance openings formed therein above the bottoms of said walls and through which said lower horizontal portion of said core extends, said walls having portions below said lower core clearance openings and which are electrically interconnected and form a closed electrical circuit around the outside of siad core; said upstanding metal walls each having a gap formed therein in each instance extending completely between and joining with said core clearance openings.

3,878,312
COMPOSITE INSULATING BARRIER

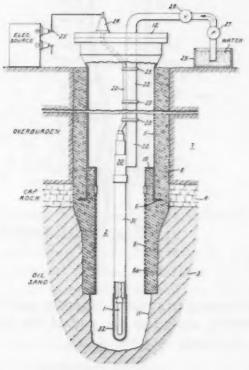
Dustin D. Bergh, Lenox, Mass.; Charles H. Titus, Newtown Square, and J. Kenneth Wittle, Berwyn, both of Pa., assignors to General Electric Company

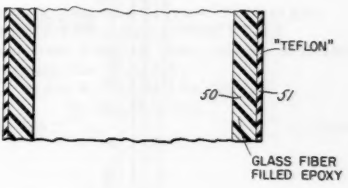
Filed Dec. 17, 1973, Ser. No. 425,474

Int. Cl. E21b *43/24;* **H01b** *17/60*

U.S. Cl. 174—9 F **6 Claims**

1. In combination with two bodies of electrically conductive fluid having a high unidirectional potential difference therebetween, said fluids being exposed to high temperature and high differential pressure conditions, a composite insulating barrier interposed between and in contact with said fluids, said barrier comprising a first layer of insulating material having a highly negative resistance-temperature coefficient and a second layer of insulating material having a substantially less negative resistance-temperature coefficient, at least one said insulating layer having sufficient mechanical strength to withstand said differential pressure, whereby increasing temperature progressively reduces the voltage stress imposed across said first layer of insulating material.



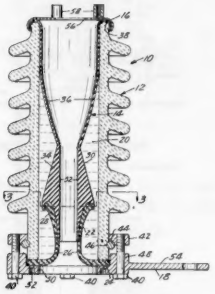


3,878,313

PRE-ASSEMBLED CABLE TERMINATION

Wayne F. Varner, Woodbury, and Gerald A. Wyatt, Shoreview, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 4, 1974, Ser. No. 511,995
Int. Cl. H02g *15/22*
U.S. Cl. 174—19 **9 Claims**



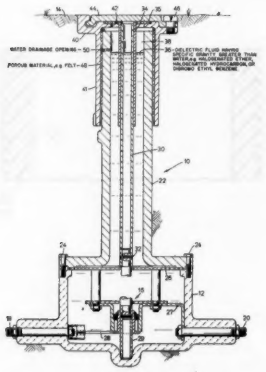
4. Termination of claim **1** wherein said thin-walled portion is hermetically sealed to the end of the insulating body by a centrally perforate metal end cap.

3,878,314

PROTECTIVE APPARATUS FOR UNDERGROUND HIGH VOLTAGE ELECTRICAL DEVICES

Edwin A. Link, Waukesha, Wis., assignor to RTE Corporation, Waukesha, Wis.

Filed Oct. 26, 1973, Ser. No. 410,043
Int. Cl. H01h *9/02;* **H05k** *5/02*
U.S. Cl. 174—37 **9 Claims**



1. A protective apparatus for separating water from a high voltage electrical device comprising:

a housing having an opening at the top,

an electrical device in said housing,

means closing the opening at the top of said housing,

means within said housing for actuating said device from ground level,

a fluid dielectric medium substantially filling said housing, said medium having a specific gravity greater than water whereby any water entering the housing will accumulate on the surface of the dielectric medium,

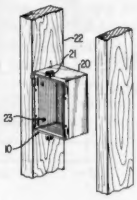
and means in said closing means for allowing water accumulated at the top of said dielectric medium to escape from said closing means.

3,878,315

ATTACHABLE EXTENSION FOR AN ELECTRICAL OUTLET HOUSING

Jerry F. Blush, 9447 Washington Blvd., Lanham Park, Md. 20801

Filed Jan. 24, 1973, Ser. No. 326,566
Int. Cl. H02g *3/12*
U.S. Cl. 174—57 **4 Claims**



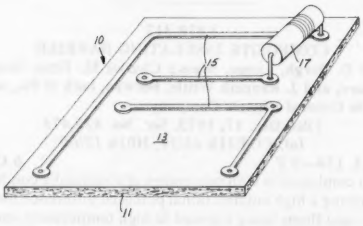
1. An attachment for a housing for extending the depth of the same comprised of a body defined by a pair of units, each of said units being defined by an open three sided configuration comprised of a pair of end members connected at one thereof by a side member, said side and end members being provided with spaced openings, therein, each unit being positioned with the open sides adjacent to one another, means securing the end members to one another, said means comprising a tie member of a length substantially equal to that of said side member, said tie members being provided with openings coinciding with those of said end members when disposed in a straddling position with respect thereto, fastener means extending through said coinciding openings rigidly securing the same together, and oppositely disposed mounting ears provided on said pairs of members for facilitating its mounting onto a housing.

3,878,316

LAMINATE COMPRISING NON-WOVEN FIBROUS BACKING

Gaylord L. Groff, 3M Center, Saint Paul, Minn. 55101

Continuation of Ser. No. 152,591, June 14, 1971, abandoned, which is a continuation-in-part of Ser. No. 53,120, July 8, 1970, abandoned. This application Jan. 16, 1973, Ser. No. 324,219
Int. Cl. H05k *1/00*
U.S. Cl. 174—68.5 **13 Claims**



1. An article comprising an electrically conductive metal film layer in adherent contact with a major surface of a sheet-like nonwoven web impregnated with an electrically insulative, moisture-insensitive thermoset resin, said sheet-like nonwoven web being formed from a fiber blend comprising at

least 15 weight % discontinuous synthetic heat softenable fibers, said synthetic heat-softenable fibers being at least partially heat softenable at temperatures below 200° C., and, in intimate admixture with said heat softenable fibers, at least 10 but no more than about 75 weight % discontinuous synthetic heat resistant fibers, said heat resistant fibers being resistant to temperatures in excess of 250° C.

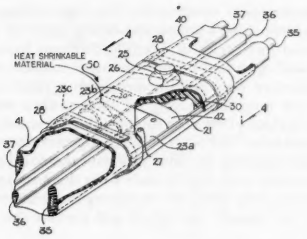
6. An article according to claim **1** further comprising electrical components electrically connected to said electrically conductive layer.

3,878,317

CABLE SPLICE ASSEMBLY

Edward S. Plaskon, Clifton, N.J., assignor to Walter A. Plummer, Sherman Oaks, Calif.

Filed Apr. 2, 1973, Ser. No. 346,923
Int. Cl. H02g *15/08*
U.S. Cl. 174—92 **9 Claims**



1. An electrical cable splice assembly for protecting each spliced conductor in a cable comprised of one or more conductors, comprising:

a. an inner cover circumferentially surrounding each said spliced conductor each of said inner covers being comprised of a generally cylindrical flexible plastic member having a first pair of interlocking tracks fixably secured to corresponding edges along the length thereof and interlocked with each other securing said inner cover about each said conductor, each of said inner covers having apertures disposed therethrough to allow a liquid to pass from the exterior to the interior thereof;

b. an outer jacket circumferentially surrounding said conductors and each said inner cover, said outer jacket being comprised of a generally cylindrical flexible plastic member having a second pair of interlocking tracks fixably secured to corresponding edges along the length thereof, said second pair of tracks securing said outer jacket around said conductors and each of said inner covers, said outer jacket having fixably secured thereto at least one valve arranged and configured to allow a liquid to pass from the exterior to the interior thereof; and

c. a low hardened dielectric compound disposed within the volume of space between said outer jacket and each said inner cover, and between each said inner cover and said corresponding spliced conductor;

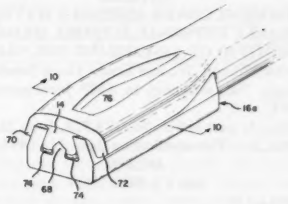
whereby said splice assembly protects said conductors from the element.

3,878,318

ALUMINUM ELECTRICAL CONNECTION

George William Ziegler, Jr., Carlisle, and Henry William Demler, Jr., Lebanon, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 320,021, Jan. 2, 1973, Pat. No. 3,777,051. This application Sept. 4, 1973, Ser. No. 393,841
Int. Cl. H02g *15/08*
U.S. Cl. 174—94 R **1 Claim**



1. An electrical connection between an aluminum terminal and an aluminum conductor comprising:

a. an elongated aluminum terminal member having an axially extending channel defined by a floor and sidewalls extending upwardly from either side of the floor wherein the sidewalls thereof converge inwardly away from the floor, the degree of convergence being about 70° to about 80° relative to the floor, said floor containing an insulation piercing projection adapted to cut into and peel back insulation which may be present on an aluminum conductor; and

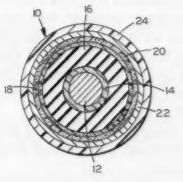
b. a length of insulated aluminum conductor deformably pressed into said channel wherein said projection pierced through the insulation, peeling such away and wherein a single transitional zone adapted to eliminate internal stress in the aluminum conductor adjacent said aluminum terminal includes a gradual change from the deformed length of said aluminum conductor to the non-deformed aluminum conductor extending up to the aluminum terminal.

3,878,319

CORONA-RESISTANT ETHYLENE-PROPYLENE RUBBER INSULATED POWER CABLE

Ralph Edward Wahl, Prumbull, Conn., assignor to General Electric Company, New York, N.Y.

Filed July 8, 1974, Ser. No. 486,523
Int. Cl. H01b *9/02*
U.S. Cl. 174—106 SC **12 Claims**



1. An electric power cable composed of an assemblage of a conductor having a composite covering thereabout, comprising the combination including:

a. a metallic conductor;

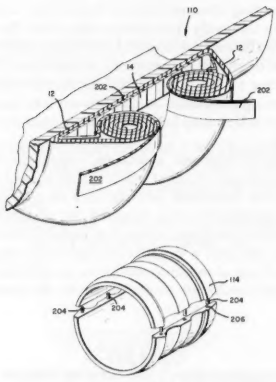
b. a dielectric insulating body of a cured ethylene-propylene rubber compound surrounding the conductor, said cured ethylene-propylene rubber compound having been treated by heating to a temperature of at least about 200°F subsequent to its curing;

c. a vapor-permeable coating comprising an ethylene-containing polymer and electro-conductive filler covering and adhered to said cured and heat-treated ethylene-propylene rubber compound;
d. a layer of semiconductive material comprising an elastomer and electroconductive filler overlying said vapor-permeable coating; and
e. an enclosing protective jacket of heat cured polymer.

3,878,320
RESILIENT COVER ASSEMBLY HAVING A REMOVABLE EXTERNAL SUPPORT MEMBER AND METHOD OF ASSEMBLING THE SAME

James Lenhart Mixon, Jr., and Ernest Lloyd Beinhaur, both of Harrisburg, Pa., assignors to AMP Incorporated, Harrisburgh, Pa.

Continuation-in-part of Ser. No. 373,528, June 25, 1973, Pat. No. 3,824,331. This application June 21, 1974, Ser. No. 481,606
Int. Cl. H01r *5/00*
U.S. Cl. 174—135 **7 Claims**



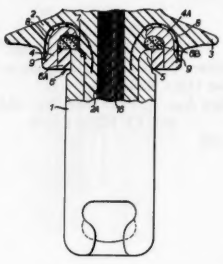
1. A resilient cover assembly useful for covering the spliced area of cables, which comprises:
a. an annular support member;
b. an elongated ribbon extending through the support member; and
c. a stretched, elongated resilient cover member extending through the support member with the ends of the cover member rolled up to provide rolls which are removably positioned on the outer surface of either end of the support member and with the ends of the ribbon extending out from either roll so that the rolls may be unrolled by pulling on the ribbon ends.

6. A method of assembling a resilient cover assembly of the type useful for covering the spliced area of cables, which comprises the steps of:
a. providing an annular support member;
b. placing an elongated ribbon through the support member with the ends of the ribbon positioned on the outer surface thereof;
c. positioning a resilient sleeve-like, cover member through the support member; and
d. rolling up the ends of the cover member toward the center thereof and onto the ends of the support member with the ends of the ribbon positioned between the rolled up cover member and the support member and extending out from each rolled up end.

3,878,321
HIGH VOLTAGE ELECTRIC INSULATOR TERMINATION CONSTRUCTIONS

Richard Anthony Ely, Redmarley, England, assignor to Transmission Development Limited, Gloucester, England

Filed Jan. 28, 1974, Ser. No. 437,028
Claims priority, application United Kingdom, Feb. 17, 1973, 7894/73
Int. Cl. H01b *17/38, 17/42*
U.S. Cl. 174—144 **10 Claims**

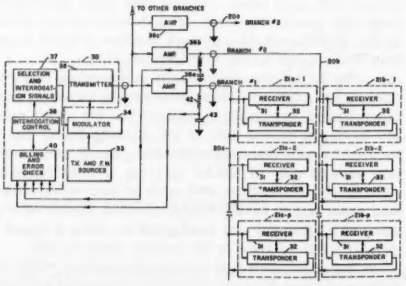


1. A termination construction for high voltage electric insulators comprising a hollow end-fitting electrode providing an open end for receipt of a tensile core and having a nose spigot at said open end forming an outer surface, an electrically conductive nose ring formed from a rigid conductive material, the nose ring having an inner surface which faces said outer surface of the nose spigot, a flexible sealing material bonding said inner and outer surfaces together, means electrically interconnecting the nose ring with the nose spigot, and a surface of the nose ring, remote from the nose spigot, providing an area onto which the insulating material for the insulator may be bonded, and which will provide the electrical interface.

3,878,322
INTERROGATED SYSTEM

Herbert W. Sullivan, New York, N.Y., assignor to Skiatron Electronics & Television Corporation, New York, N.Y.

Division of Ser. No. 30,599, April 21, 1970, Pat. No. 3,757,035, which is a continuation of Ser. No. 297,397, July 24, 1963, abandoned. This application Feb. 28, 1973, Ser. No. 336,894
Int. Cl. H04n *1/44*
U.S. Cl. 178—5.1 **13 Claims**



1. A selectively actuated transponder for retransmitting interrogation signals received from a central station comprising

means responsive to a group of predetermined selection signals for producing a transponder actuating signal,

means for modifying the received interrogation signals in accordance with certain informational characteristics,

means responsive to said actuating signal for transmitting the modified interrogation signals back to the central station, and

means for imparting to the retransmitted signals a frequency characteristic which is indicative of the transponder producing them.

3,878,323

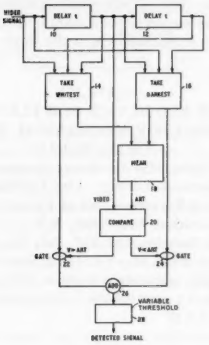
DETECTING DEVICES FOR IMAGE ANALYSIS SYSTEMS

Colin Fisher, Royston, England, assignor to Image Analysing Computers Limited, Royston, England

Continuation-in-part of Ser. No. 820,532, April 30, 1969, Pat. No. 3,621,129. This application Aug. 24, 1971, Ser. No. 174,360

Int. Cl. H04n *7/18*

U.S. Cl. 178—6.8 **42 Claims**



1. A detection device for use in a line by line scanning system in which an image is scanned and a video signal is produced representative of said scanned image said detection device including,

delay means for delaying the video signal to produce a second video signal,

means for generating a reference voltage having a value which lies between the amplitude values of the signals supplied thereto,

means for supplying said video signal and second video signal to the reference voltage generating means,

comparator means for comparing the instantaneous amplitude of the second video signal with the reference voltage and,

means operable in response to the comparison to release the voltage representative of the lower of the two video signal amplitudes while the instantaneous amplitude of the second video signal is less than the reference voltage and a voltage representative of the higher of the two amplitudes while the instantaneous amplitude exceeds the reference voltage.

3,878,324

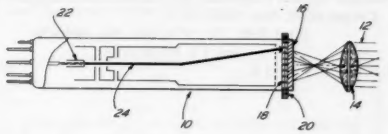
SMEARING EFFECT ATTENUATOR

Paul S. Tubbs, Collingswood, N.J., and David R. Flanders, Pottstown, Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 1, 1974, Ser. No. 457,013

Int. Cl. H04n *5/21, 5/34*

U.S. Cl. 178—7.2 **7 Claims**



1. In a television camera system including a vidicon tube and horizontal and vertical drive circuits, the vertical drive circuit generating a signal having a first voltage level indicative of a vertical blanking interval and a second voltage level indicative of a vertical active scan time; wherein the improvement comprises.

gating means receiving the vertical drive circuit signal for producing an output signal in phase with the vertical signal and having a first voltage level at substantially ground potential and a second voltage level of positive polarity; and

terminal means electrically connected between the target of said vidicon tube and said gating means for receiving the output thereof;

whereby said target is neutralized upon receipt of said gating means output signal first level and is activated upon receipt of said gating means output signal second level.

3,878,325

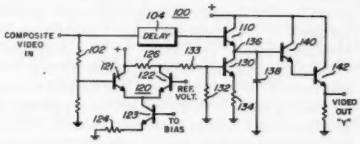
NOISE PROCESSING CIRCUIT FOR A TELEVISION RECEIVER

Gildo Cecchin, Niles, and Francis H. Hilbert, Addison, both of Ill., assignors to Motorola, Inc., Franklin Park, Ill.

Filed Feb. 5, 1973, Ser. No. 329,924

Int. Cl. H04n *5/48*

U.S. Cl. 178—7.3 DC **6 Claims**



1. A noise processing circuit arrangement for a television receiver, including in combination:

means for receiving a composite video signal having a portion for conveying sync components and a further portion for conveying video information varying between set white and black levels, said composite video signal being subject to the introduction of undesired noise components;

means for translating said composite video signal information to a terminal and further including means coupled with said terminal for supplying a charge level corresponding to the instantaneous level of the translated composite video signal to a memory storage means;

normally operative discharge means coupled with said terminal for providing a discharge path for such memory storage means; and

circuit means for monitoring said derived composite video signal and deactivating said discharge means and said translating means in response to a noise component

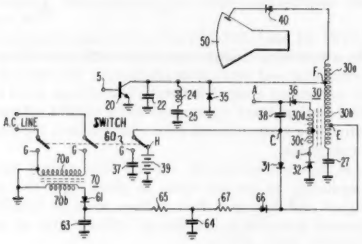
above a predetermined magnitude, the memory storage means during the deactivation of said translating means maintaining video level at said terminal at substantially the same level as that immediately prior to the occurrence of the said noise component.

3,878,326

VOLTAGE SUPPLY SYSTEM

William Vincent Fitzgerald, Jr., Carmel, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 27, 1974, Ser. No. 446,456
Int. Cl. H04n *3/16*
U.S. Cl. 178—7.3 R **8 Claims**



1. In a television receiver operable alternatively from a first source of alternating current line derived voltage or from a second substantially lower voltage direct current voltage source, a direct current voltage supply system comprising:

a deflection generator;

a first winding coupled to said deflection generator for having voltage variations induced thereacross in response to current flow in said deflection generator;

rectifying means coupled to said winding for rectifying said voltage variations;

filtering and storage means for filtering and storing said rectified voltage variations; and

switching means for coupling said winding and rectifying means to said filtering and storage means when said receiver is operable from said first voltage source for providing at a terminal of said filtering and storage means a direct current voltage substantially equal to said second voltage for supplying said direct current voltage, said switching means switchable for coupling said second voltage source to said winding and rectifying means when said receiver is operable from said second voltage source for biasing said rectifying means for preventing the rectification of said voltage variations induced in said winding for inhibiting current flow in said winding for preventing power losses in said winding due to current flow therein.

3,878,327

TELEVISION SYSTEM FOR IMPROVING READING SKILLS

Marcus H. Uhler, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

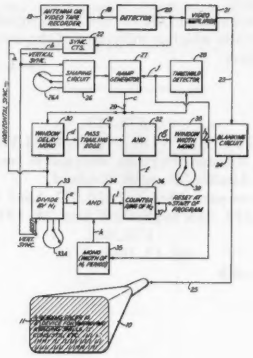
Filed Oct. 17, 1973, Ser. No. 407,328
Int. Cl. H04m *1/38*
U.S. Cl. 178—7.5 R **11 Claims**

1. In a system to form a video display window within a blanked raster of a television receiving tube, the combination of:

television receiver means for deriving a video signal corresponding to scan lines of video information for display on the television receiving tube,

blanker means for defining a single video signal display window within the blanked raster of said television receiving tube,

means delivering blanking pulses to said blanker means for blanking portions of selected horizontal scan lines to determine the dimensional size of said single video signal



display window to display selected portions of a plurality of said scan lines of video information, and

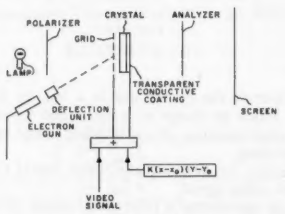
timing control means for controlling the display duration of the video information within the single display window.

3,878,328

METHOD OF AND DEVICE FOR ELECTRONICALLY COMPENSATING FOR MECHANICAL STRESSES IN AN OPTIC RELAY

Gerard J. M. Marie, Hay-Les-Roses; Jacques Donjon, Yerres; Auguste Raymond LePape, Viry-Chatillon, and Bernard Monod, Limeil-Brevannes, all of France, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 162,507, July 14, 1971, abandoned. This application May 16, 1973, Ser. No. 360,773
Claims priority application France, July 17, 1970, 7026420
Int. Cl. H04n *5/68, 5/74;* **G02f** *1/26*
U.S. Cl. 178—7.5 D **7 Claims**



1. A method of electrically compensating for mechanical stresses occuring in a Pockels effect crystal used in conjunction with a television type electronic scanner in an optic relay supplied with video information signals comprising the steps of generating a voltage corresponding to the formula:

$$v = k\,(x - x_o)\,(y - y_o),$$

where

x and y = the Cartesian scanning coordinates,

x_o and y_o = the coordinates of the center of symmetry of the stresses,

k = a factor which is proportional to the stresses to be compensated for,

and superimposing the generated voltage on the video information signal.

5. A method for electronically compensating for stresses occurring in a Pockels effect crystal used in conjunction with a polar-type electronic scanner of an optic relay supplied with video information signals, comprising the steps of generating a voltage corresponding to the formula:

$$v = k' r^2 \sin (2\theta)$$

where:

r and θ are the polar scanning coordinates and

k' is a factor which is proportional to the stresses to be compensated for, and superimposing the generated voltage on the video information signal.

3,878,329

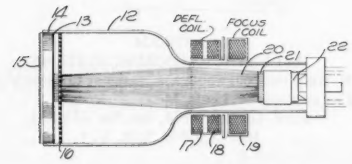
ORTHOSCOPIC IMAGE TUBE

Kenneth A. Brown, Saugus, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Aug. 22, 1973, Ser. No. 390,338

Int. Cl. H04n *5/64*

U.S. Cl. 178—7.85 **7 Claims**



1. A cathode ray orthoscopic image display device for forming three dimensional presentations from programmed X, Y and Z signals, comprising:

an evacuated enclosure;

means within said enclosure for producing an electron beam of relatively large cross-section;

a phosphor screen along a transparent predetermined portion of the inside surface of said enclosure;

deflection means for causing said electron beam to scan over at least a portion of the surface of said phosphor screen;

a fly's eye lens array adjacent and substantially parallel to the viewing surface of said phosphor screen;

and an aperture lens array comprising an apertured plate adjacent and parallel to said phosphor screen within said enclosure, said plate containing a plurality of apertures each substantially aligned with a corresponding lenslet within said fly's eye lens array on the opposite side of said phosphor screen;

and means for effecting dynamic focus control whereby the point of crossover from convergence to divergence of said electron beam may be controlled in accordance with said Z signal.

3,878,330

OPTICAL VIEWING SYSTEM

Warren D. Novak, Chappaqua, N.Y., assignor to The Mosler Safe Company, Hamilton, Ohio

Filed Apr. 1, 1974, Ser. No. 456,861

Int. Cl. G02b *15/18;* **H04n** *5/26*

U.S. Cl. 178—7.92 **11 Claims**

1. A variable magnification optical viewing system for viewing a magnified objective comprising

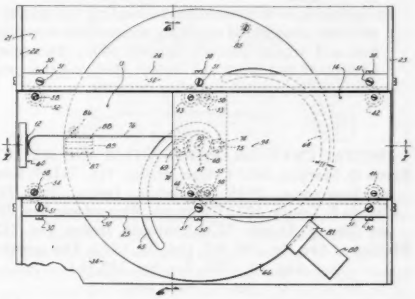
a display device supporting platen reciprocable in a first path of movement,

a display device mounted upon said platen, said device having a display surface located in an image focal plane,

a lens supporting carriage reciprocable in a second path of movement parallel to said first path of movement of said platen,

a lens mounted upon the carriage between the display device and the objective, said lens having an optical axis located parallel to said first and second paths of movement of said platen and carriage,

focusing means for continuously maintaining the focus of the objective on the display surface throughout a magnification range which varies from less than 1 to more than 1, said focusing means including



means for moving the display device supporting platen and the lens supporting carriage in synchronization along said paths of movement, said moving means comprising a flat plate cam having a pair of discrete separated cam grooves within each one of which there is a cam follower, one of said cam followers being operatively connected to said display device supporting platen and the other of said cam followers being operatively connected to said lens supporting carriage such that rotary movement of the cam effects precise movement of the lens carriage and the display device supporting platen.

3,878,331

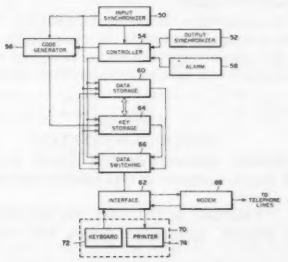
DIGITAL CRYPTOGRAPHIC SYSTEM AND METHOD

Barrie O. Morgan, 3404 Colgate, Dallas, Tex. 75225; Kenneth M. Branscome, 5935 Vanderbilt, Dallas, Tex. 75206; George E. Goode, 1222 Chippewa, Richardson, Tex. 75080, and John Q. Atchley, 7432 Lynworth, Dallas, Tex. 75240

Division of Ser. No. 299,387, Oct. 20, 1972. This application Aug. 10, 1973, Ser. No. 387,360

Int. Cl. H04l *9/00*

U.S. Cl. 178—22 **3 Claims**



1. A digital cryptographic system operable in off-line and on-line modes comprising:

means for generating clear text digital data including clear digital words,

first and second storage registers for storing said clear digital words,

input and output synchronizers operable to control said storage registers,

means for generating randomized digital data,

encoding circuitry for receiving said clear digital words and said randomized digital data for generating encoded digital data,

off-line mode switch means for connecting said system such that said clear digital words are stored in said first storage register under the control of said input synchronizer prior to being shifted to said encoding circuitry, and

on-line mode switch means for connecting said system such that said clear digital words are sequentially stored in said first and second storage registers under the sequential control of said input and output synchronizers prior to being shifted to said encoding circuitry.

3,878,332

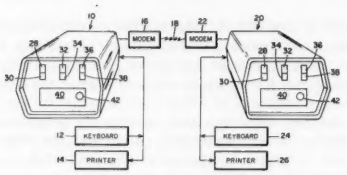
DIGITAL CRYTOGRAPHIC SYSTEM AND METHOD

Barrie O. Morgan, 3404 Colgate, Dallas, Tex. 75225; Kenneth M. Branscome, 5935 Vanderbilt, Dallas, Tex. 75206; George E. Goode, 1222 Chippewa, Richardson, Tex. 75080, and John Q. Atchley, 7432 Lynworth, Dallas, Tex. 75240

Division of Ser. No. 299,387, Oct. 20, 1972. This application Aug. 10, 1973, Ser. No. 387,361

Int. Cl. H04l *9/02*

U.S. Cl. 178—22 **1 Claim**



1. An on-line digital cryptographic system comprising:

means for receiving clear digital words from an input data terminal,

a first register connected to said means for storing each clear digital word,

circuitry for detecting the clear digital words stored in said register and for changing the stored digital words upon the detection of a forbidden digital character,

a second register for receiving in parallel the stored clear digital words from said first register,

output synchronizer means for applying a shift pulse to said second register to shift the stored clear digital words out of said second register,

a modulo-2 adder for receiving the clear digital words from said second register,

means for applying a randomized digital key stream to said adder in order to encipher the clear digital words, and

means for transmitting said enciphered digital words on a substantially real time basis to a remote decoding station.

3,878,333

SIMPLEX ARQ SYSTEM

Otoomi Shimizu, Saitama-ken, and Hitoshi Koyano, Tokyo, both of Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

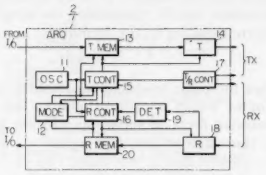
Filed Dec. 5, 1973, Ser. No. 421,947

Claims priority, application Japan, Dec. 12, 1972, 47-123927

Int. Cl. H04l *1/18*; **G06f** *11/00*

U.S. Cl. 178—23 A **5 Claims**

1. A method for transmitting digital data in a simplex ARQ communication system consisting of a master and a slave station comprising the steps of transmitting a block of characters from the master station to the slave station, transmitting a control signal from the slave station to the master station indicating if said block of characters has been transmitted correctly, re-transmitting said block of characters in the case



where said control signal indicates the preceding block of characters was transmitted incorrectly, characterized in that the number of characters in said block is variable in direct correspondence with instantaneous transmission quality.

3,878,334

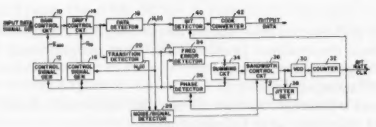
DATA SYNCHRONIZING SYSTEMS

Peter H. Halpern, Longwood, Fla., assignor to General Dynamics Corporation, St. Louis, Mo.

Filed Apr. 10, 1974, Ser. No. 459,834

Int. Cl. H03d *3/18*, *3/24*

U.S. Cl. 178—69.5 R **24 Claims**



1. A system for acquisition of data transmitted in the form of repetitive input data signals having successive signalling intervals of equal duration during which data signals representing different data can be transmitted, changes in the state of said data being represented by transitions in said data signals, said system comprising

a. a filter matched to signals which are orthogonal to said data signals, said data signals being applied to said filter,

b. first circuit means connected to said filter for providing a first error signal having an amplitude which is a measure of the noise to signal characteristic of said data signal,

c. a phase locked loop having a phase detector which provides an error voltage to control the phase of output signals produced by a voltage controlled oscillator, which is coupled to said phase detector, and also having means in said loop for controlling the bandwidth thereof,

d. means connected to said filter and being coupled to said phase detector for detecting said transitions and locking said loop in response thereto,

e. means coupled to said loop for providing a second error signal having an amplitude which is a measure of the rms variations in frequency of said output signal,

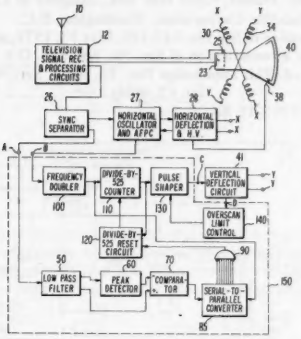
f. means for applying said first and second error signals to said bandwidth control means for adapting said loop for changes in the noise in said data signals and error in the frequency of said signalling intervals thereof, and

g. means for detecting the data represented by said data signals synchronously with said output signals.

3,878,335
DIGITAL SYNCHRONIZATION SYSTEM

Alvin Reuben Balaban, Raritan, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 18, 1973, Ser. No. 407,696
Int. Cl. H04m *5/06*
U.S. Cl. 178—69.5 TV **11 Claims**



1. A digital synchronizing system comprising:

a first source of synchronizing pulses;

a second source of synchronizing pulses which is subject to degradation;

resettable counting means coupled to said first source of synchronizing pulses for counting pulses generated in said first source of synchronizing pulses and for generating a first reset pulse upon the counting of a constant number of pulses from said first source of synchronizing pulses;

converting means coupled to said first source of synchronizing pulses and to said second source of synchronizing pulses for sampling the voltage level of pulses generted by said second source of synchronizing pulses at a rate determined by the rate of said first source of synchronizing pulses and for storing information representative of said sampled voltage level;

gating means coupled to said converting means for monitoring said stored information in said converting means and for generating a second reset pulse when said stored information corresponds to a pulse having time duration characteristics substantially equal to the time duration characteristics of pulse components from said second source of synchronizing pulses;

resetting means coupled to said gating means and to said resettable counting means for resetting said resettable counting means upon the incidence of either one or both of said first and second reset pulses; and

a deflection circuit coupled to said resettable counting means, the operation of which is synchronized by the occurrence of a pulse generated in said resettable counting means.

3,878,336
DIGITAL SYNCHRONIZING SYSTEM

Alvin Reuben Balaban, Raritan, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 18, 1973, Ser. No. 407,700
Int. Cl. H04m *5/06*
U.S. Cl. 178—69.5 TV **13 Claims**

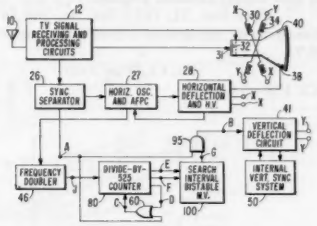
1. A synchronizing system comprising:

a first source of synchronizing pulses subject to degradation;

a second source of synchronizing pulses for providing pulses in a particular multiple of the frequency of occurrence of pulses from said first source of pulses;

resettable counting means coupled to said second source of synchronizing pulses for counting said multiple of synchronizing pulses provided by said second source of synchronizing pulses and for producing signals representative of counting first, second and third number of pulses from said second source of synchronizing pulses;

resetting means coupled to said resettable counting means and to said first source of synchronizing pulses for resetting said resettable counting means upon the occurrence of said second number of pulses from said second source of synchronizing pulses or upon the occurrence of a pulse from said first source of synchronizing pulses;



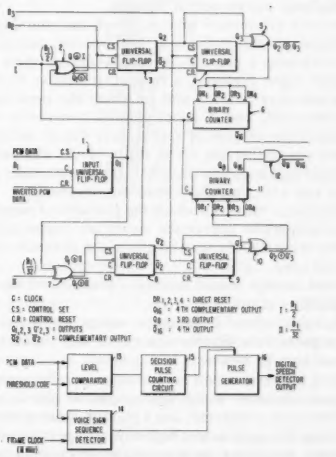
enabling means coupled to said resettable counting means for producing an enabling signal during the interval between said first number and said third number of pulses of said resettable counting means; and

coincidence gating means coupled to said enabling means and to said first source of synchronizing pulses for allowing pulses from said first source of synchronizing pulses to pass through said synchronizing system during the incidence of said enabling signal.

3,878,337
DEVICE FOR SPEECH DETECTION INDEPENDENT OF AMPLITUDE

Ettore Fariello, Gaithesburg, Md., assignor to Communications Satellite Corporation, Washington, D.C.

Filed Mar. 13, 1970, Ser. No. 19,188
Int. Cl. H04b *15/00*
U.S. Cl. 179—1 VC **18 Claims**



1. A method for detecting a speech signal in the presence of noise independent of the amplitude of said speech signal wherein said speech signal is sampled into a plurality of samples each sample having a characteristic sign represented by a binary 1 or a binary 0, comprising:

a. detecting the sign of each successive sample;

b. determining the presence of a predetermined sequence of signs characteristic of said successive samples, said sequence comprising a mixture of the sign represented by a binary 1and the sign represented by a binary 0; and

c. generating a pulse, indicative of speech, when said predetermined sequence of signs is present for a predetermined period of time.

3,878,338

TIME DIVISION MULTIPLEX TELECOMMUNICATIONS SYSTEMS

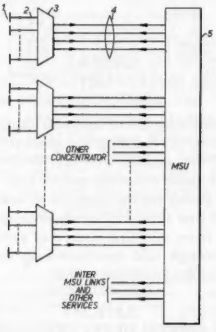
John Heskeith Martin Hardy, Ipswich, England, assignor to The Post Office, London, England

Filed Nov. 21, 1972, Ser. No. 308,551

Claims priority, application United Kingdom, Nov. 25, 1971, 54739/71

Int. Cl. H04j *3/00*

U.S. Cl. 179—15 AT **25 Claims**



1. A time division multiplex digital switching network comprising, in combination

a plurality of pulse code modulated communication systems each comprising a plurality of channels, with a plurality of serial digits per channel, each system having an input highway and an output highway,

a receive conversion unit to which the plurality of input highways are connected, said receive conversion unit comprising a plurality of receive delays, there being for each input highway, a respective unique receive delay which may be zero and to which the input highway is connected, and a series/parallel conversion means to which the outputs of said receive delays are connected, for converting the serial digits of the channels of said input highways into parallel form on a plurality of outputs of said series/parallel conversion means,

first storage means to which the plurality of outputs of said series/parallel conversion means are connected, for storing in parallel the serial digits of the channels of the input highways,

second storage means having a plurality of inputs and a plurality of outputs,

switchable t.d.m. connection means for interconnecting outputs of the first storage means with inputs of the second storage means,

a send conversion unit comprising a parallel/series conversion means to which the outputs of the second stage means are connected, and a plurality of send delays, there being, for each output highway, a respective unique send delay, which may be zero and to which an output of said parallel/series conversion means is connected, for converting parallel digital information on the outputs of said second storage means into serial form on any one of a plurality of outputs of said send delays, each output highway being connected to the output of the respective send delay,

control means for operating said connection means to establish a desired connection between a channel of an input highway and a channel of an output highway by reading-out in parallel from the first storage means the digits of the said input channel at a time allocated by said connection means and writing-in said read-out in parallel into the second storage means at the said allocated time.

3,878,339

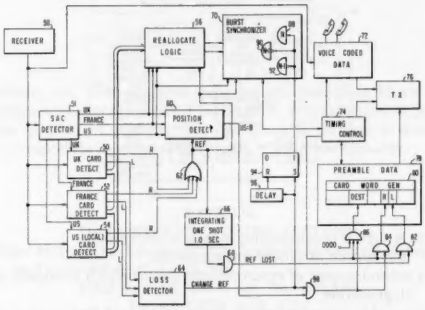
REFERENCE STATION FAILURE IN A TDMA SYSTEM

Wilfrid G. Maillet, Oxon Hill, Md., assignor to Communications Satellite Corporation, Washington, D.C.

Continuation of Ser. No. 143,180, May 13, 1971, abandoned, which is a continuation of Ser. No. 866,629, Oct. 15, 1969, abandoned. This application Dec. 18, 1973, Ser. No. 425,762

Int. Cl. H04j *3/06*

U.S. Cl. 179—15 BS **7 Claims**



1. In a TDMA system having multiple stations and a frame format comprising one burst of transmitted data from each operating station in a non-overlapping sequence, a burst from a single station in the sequence being designated the reference burst, a method for preventing failure of system synchronization as a result of loss of a reference indication, said method at a local station comprising,

a. monitoring bursts received from all stations to detect the presence of a reference signal identifying one of the received bursts as a reference burst,

b. transmitting, during the local station burst time, a "lost" signal identifying that the reference station is lost when said reference signal has not been detected for a preset time period,

c. monitoring bursts received from all stations to detect the presence of "lost" signals, and

d. preventing any alteration of the local station burst transmit time relative to the other stations for a period of time following detection of "lost" signals in a predetermined number of received bursts.

3,878,340

RING TRIP CIRCUIT EMPLOYING A FILTER NETWORK AND A SOLID STATE DEVICE EXHIBITING ELECTRICAL ISOLATION

William E. Shaffer, Rochester, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.

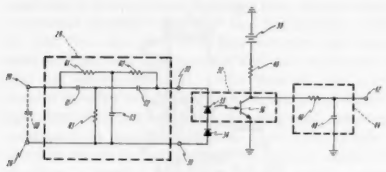
Continuation-in-part of Ser. No. 255,544, May 22, 1972, Pat. No. 3,839,603. This application Dec. 29, 1972, Ser. No. 319,270

Int. Cl. H04m *3/04*

U.S. Cl. 179—18 HB **7 Claims**

1. A ring trip circuit for use in a telephone series ringing circuit, the series circuit including a telephone line, at least one telephone instrument connected thereto, a ringing generator for providing AC ringing signals to operate a signalling device in the telephone instrument to indicate a telephone call on the line and a battery for providing a DC current when the call is answered, comprising an optoelectronic coupler having an input circuit for producing a signal proportional to the current therethrough and an output circuit electrically iso-

lated from said input circuit whose conductivity state is a function of said signal, a delay circuit connected across the output circuit of the optoelectronic coupler and a parallel-T resistance-capacitance network having a first pair of terminals for connection in the series circuit and a second pair of terminals for connection to said input circuit, said network providing two current paths, one for passing the ringing signals while blocking DC current and the other for passing DC current through said input circuit to the substantial exclusion of the ringing signals.

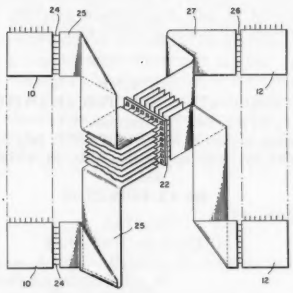


3,878,341

INTERSTAGE LINKAGE FOR SWITCHING NETWORK

John William Balde, Raritan Township, Hunterdon County, N.J., assignor to Western Electric Company, Incorporated, New York, N.Y.

Filed Oct. 11, 1973, Ser. No. 405,983
Int. Cl. H04q *1/06*
U.S. Cl. 179—98 **8 Claims**



1. In an electrical network having a plurality of first devices and a plurality of second devices, the devices having input and output terminals, an interstage linkage for connecting the first devices to the second devices, which comprises:

a plurality of first flat cables, each connected at one end to the output terminals of an associated first device;

a plurality of second flat cables, each connected at one end to the input terminals of an associated second device, the remaining ends of the first cables being stacked parallel to each other, the remaining ends of the second flat cables being stacked parallel to each other and substantially perpendicular to the plane of the first cables, the stacked cables being positioned to place the end of each conductor in the second cables substantially opposite the end of a corresponding conductor in the first cables; and

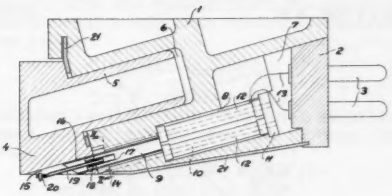
means for connecting each conductor in the second cables to its corresponding opposed conductor in the first cables.

3,878,342

REPLACEABLE STYLUS FOR STEREOPHONIC PHONOGRAPH PICKUP

Henning Schmidt Madsen, Hillerod, and Robert Gudmandsen, Taastrup, both of Denmark, assignors to Fonofilm Industri A/S, Copenhagen V, Denmark

Filed Aug. 18, 1972, Ser. No. 281,810
Int. Cl. H04r *11/00*
U.S. Cl. 179—100.41 D **26 Claims**



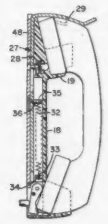
8. The combination according to claim **7**, wherein said armature is a permanent magnet.

3,878,343

SHOCKPROOF TELEPHONE SET

LaVerne R. Van De Wall, Rochester, N.Y., assignor to Dynalec Corporation, Rochester, N.Y.

Filed May 7, 1973, Ser. No. 357,668
Int. Cl. H04m *1/02*
U.S. Cl. 179—100 R **8 Claims**



1. A shockproof telephone set comprising:

a. a handset having a longitudinal handle with a transmitter unit at one end and a receiver at the other end thereof disposed along a given longitudinal handset axis,

b. a frame having at least one cradle disposed along a given frame axis for cradling said one end of said handset therein,

i. said frame having a longitudinal channel along said frame axis, and

c. a slide bracket means including a slide portion slideable in said channel of said frame along said frame axis and a retainer portion moveable in cooperative relationship with said one cradle and said other end of said handset for yieldingly urging said handset into said one cradle and against said frame,

i. said slide bracket means includes a biasing spring connected to said frame and to said slide portion for urging said retainer portion towards said other end of said handset and said cradle so that said handset is yieldingly urged along said handset longitudinal axis against said frame and said cradle.

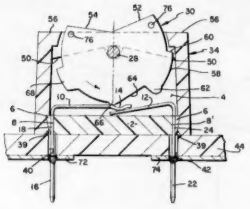
3,878,344
CAM OPERATED SWITCH ASSEMBLY HAVING SPLIT HOUSING, DOUBLE ACTION WIPING RESILIENT CONTACTS AND DETENT STRUCTURE

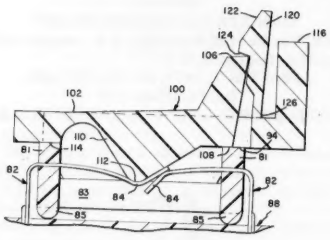
Joseph Larue Lockard, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 374,841, June 29, 1973, abandoned, Continuation-in-part of Ser. No. 243,678, April 13, 1972, abandoned. This application Feb. 1, 1974, Ser. No. 438,881

Int. Cl. H01h *21/80, 1/50, 9/02*

U.S. Cl. 200—6 B 20 Claims





1. A switch comprising, a housing, a rotary cam carried by said housing, and first and second resilient spring contacts, said cam in a first position engaging each of said contacts and resiliently deflecting each of said contacts to positions disengaged from each other, each of said resiliently deflected contacts with said cam in said first position storing spring energy which acts to provide engagement pressure against said cam and to prevent chattering engagement of said contacts, said cam being rotatable from said first position to a second position engaging said first contact and resiliently deflecting said first contact into electrical engagement with said second contact to complete an electrical circuit therebetween, said cam having a projection thereon displaceable along an arcuate displacement path as said cam is rotated from said first position to said second position, said projection being displaceable along said arcuate displacement path to an intermediate position between said first and said second positions and into engagement with said first contact and deflecting said first contact together with said second contact, with said contacts in engagement with each other, and thereby causing a first relative sliding engagement between said contacts to produce a first wiping action to improve the electrical engagement between said contacts, said projection being displaceable from said intermediate position to said second position along said arcuate displacement path allowing said first and said second contacts to deflect resiliently by resilient spring action and thereby cause a second relative sliding engagement between said contacts to produce a second wiping action for improving the electrical engagement between said contacts, and an electrical terminal portion provided on each of said contacts for making an electrical connection externally of said housing.

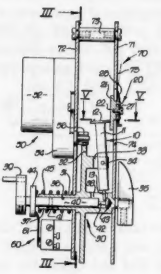
3,878,345
MULTIPLE STATION CONTROL TIMING DEVICE

Fred Hauser, 1544 Midvale Ave., Los Angeles, Calif. 90024

Filed Dec. 20, 1973, Ser. No. 426,810

Int. Cl. H01h *43/10*

U.S. Cl. 200—38 R 6 Claims



1. In a multiple station control timing device employing a timing lever movable in an orbital path relative to a plurality of timing units, each unit having a face portion adjustable into various positions into the path of said lever to cause selectable durations of deflection of said lever, the duration of deflection of said lever controlling the duration of a timing period being controlled by said device, the improvement comprising the provision of:

mounting means for movably mounting one or more of said adjustable face portions for movement in directions generally toward and away from the center of said orbital path, each face portion being of such shape that the duration of deflection of said lever by said face portion is selectively variable in predetermined manner through movement of such face portion generally toward and away from the center of said orbital path.

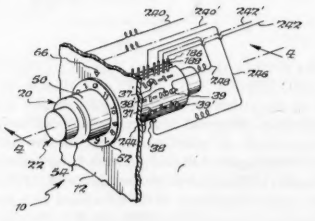
3,878,346
COMBINATION ELECTRICAL SWITCH

Franklin L. Green, Box 77, Machias, N.Y.

Continuation-in-part of Ser. No. 376,695, July 5, 1973, Pat. No. 3,801,761. This application Mar. 28, 1974, Ser. No. 455,662

Int. Cl. H01h *27/10*

U.S. Cl. 200—43 9 Claims



1. A combination electrical switch comprising in combination:

a manually rotatable combination setting dial;

a manually depressable push button;

a plurality of spaced devices each including at least one combination contact for establishing a combination setting of its associated device;

a plurality of axially aligned tumblers arranged one in association with each of said devices, each of said tumblers being rotatable relative to its associated device for driving

a tumbler associated contact into electrical contact with said combination contact associated with its device whereby to complete an electrical circuit through its device, said devices being arranged within a series circuit completed by the completion of said electrical circuit through each of said devices, adjacent tumblers having cooperating means for coupling said tumblers for rotation in a first combination setting direction when a first of said tumblers is driven in said first direction, whereas when an additional tumbler other than said first tumbler is driven in said first direction said first tumbler and tumblers intermediate said first tumbler and said additional tumbler are uncoupled while other ones of said tumblers remain coupled for driving by said additional tumbler in said first direction, and for coupling said tumblers for rotation in an opposite direction when a last of said tumblers is driven in said opposite direction, each of said tumblers is formed with at least one axially extending drive slot, and the drive slots of adjacent tumblers when coupled being disposed in alignment;

a tumbler operator being formed with at least one tumbler engaging drive pin slideably received for movement lengthwise within said drive slot of each tumbler, said tumbler operator having a normal first position wherein said drive pin is disposed in driving engagement with said first tumbler and successive axially spaced positions wherein said drive pin is disposed in driving engagement with successive ones of said tumblers;

a latch device operable to releasably retain said tumbler operator in each of said successive positions and to prevent tumbler driving rotations thereof in said opposite direction in all positions excepting a last of said successive positions wherein it is drivingly engaged with said last of said tumblers, said latch device being releasable to permit return of said tumbler operator to said first position when said drive slot of a tumbler with which said tumbler operator is presently engaged is aligned with said drive slots of said first tumbler and tumblers intermediate said first and presently engaged tumblers; and

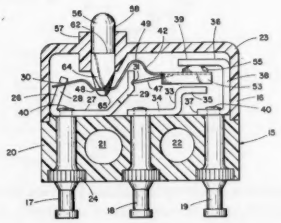
a motion transmitting assembly for coupling said tumbler operator with said dial whereby to impart rotations of said dial to a tumbler with which said tumbler operator is drivingly engaged whereby to drive its associated contact and for coupling said tumbler operator with said push button whereby successive depressions of said push button serve to step said tumbler operator between said positions thereof in a direction axially away from said first position.

3,878,347

ELECTRICAL SWITCH

John O. Roeser, Arlington Heights, Ill., assignor to Otto Engineering, Inc., Carpentersville, Ill.

Filed Feb. 4, 1972, Ser. No. 439,300
Int. Cl. H01h *13/36*
U.S. Cl. 200—67 D **23 Claims**



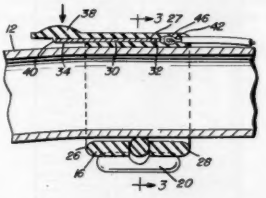
1. An electrical switch comprising a casing, an elongated switch blade having a pair of ends and a contact portion mounted within the casing so that the contact portion thereof is movable between a first position and a second position, the switch blade having a depressed portion between the ends thereof, means biasing the contact portion of the switch blade toward the first position, the biasing means providing a tensile force on the switch blade tending to straighten the depressed portion, and actuating means movably mounted in the casing, the actuating means being received by the depressed portion of the switch blade and being engageable therewith, the actuating means being movable from a first to a second position in the direction in which the depressed portion of the switch blade is depressed, movement of the actuating means from its first position to its second position causing movement of the contact portion of the switch blade from its first position to its second position.

3,878,348

MOTORCYCLE IGNITION GROUNDING SWITCH

Ronald L. German, 5131 Blairwood Dr., La Palma, Calif. 90623

Filed Dec. 3, 1973, Ser. No. 421,223
Int. Cl. H01h *9/08, 13/52*
U.S. Cl. 200—157 **7 Claims**



1. A grounding switch comprising a panel member for overlying the outer surface of a conductive member, said panel member including opposite side surfaces joined by means of an edge surface of said panel member, said panel member being constructed of insulative material and including a recess formed therein opening outwardly through said edge surface between said opposite side surfaces, a resilient conduction member disposed in and projecting outwardly of said recess, said conductive member being adapted to be electrically connected to an electrical circuit and the portion of said conductive member projecting outwardly of said recess being deflectable through a plane containing one of said side surfaces, said panel member comprising an elongated strap member constructed of elastomeric material, said edge surface comprising one longitudinal edge of said strap member, the opposite end portions of said strap member including anchor means releasably engageable with each other.

2. The combination of claim **1** wherein said panel member includes an integral flap portion thereof projecting outwardly of said edge surface and overlying said outwardly projecting portion of said conductive member on the side thereof remote from said plane.

3,878,349

DIRECT CURRENT CONTROL MEANS

James Whitman Gibbs, Hialeah, Fla., assignor to John Welsh, Green Township, Ohio

Filed Aug. 2, 1973, Ser. No. 385,067
Int. Cl. H01h *29/18*
U.S. Cl. 200—209 **19 Claims**

1. An electrical control unit comprising:

A. a cylinder defining a cylinder column of non-conductive material closed at one end and having a through hole at the other end,

B. a piston rod having one end at all times exterior of the cylinder and snugly extending through said hole;

C. a piston head, sized for snug reciprocal movement within the cylinder and of insulated material connected to said rod in said cylinder;

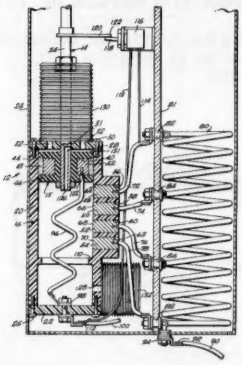
D. a recess in the surface of the head confronting the cylinder,

E. a pool of electrically conductive liquid in the recess, and having a portion comprising part of the surface of the side wall of the head;

F. wiper means included in the head and captivating the pool to constrain it to movement with the piston head,

G. a plurality of fixed and separate contacts in the piston wall, axially spaced with respect to one another, and comprising part of the surface of the cylinder column,

H. means limiting the piston head to travel in said column between a first position with the pool out of engagement with any of the contacts and a second position with the pool in contact with the contact farthest from the first



position, and permitting movement of the pool between said positions and into and out of engagement serially with said contacts;

I. said pool being sized relative to said contacts, such that the axial dimension of the pool is as great as the distance between corresponding parts of adjacent contacts;

J. circuit means connecting the contacts with an energy source means for current flow of a different voltage to each contact;

K. a conductive circuit connected to the pool and extending exteriorly of the cylinder to connect to a unit to be driven by energy of variable voltage requirement to control current flow dependant on the location of the pool in the cylinder; and

L. a balance circuit connected electrically to said pool and to the contact adjacent said first position to counteract arcing on movement of the pool from the first position into engagement with the adjacent electrical contact.

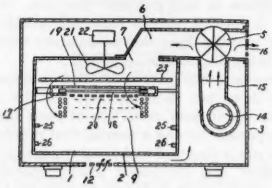
3,878,350

MICROWAVE COOKING APPARATUS

Yutaka Takagi, Takarazuka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed July 14, 1972, Ser. No. 272,007
Claims priority, application Japan, July 15, 1971, 46-62366
Int. Cl. H05b *9/06*
U.S. Cl. 219—10.55 E **10 Claims**

1. A microwave cooking apparatus comprising an oven chamber having an access opening adapted to receive an article to be cooked and having an electrically conductive inner wall, a door fitted to the chamber to open and close the access opening, microwave generator means communicating with the interior of said oven chamber for supplying microwave energy thereto, thermic ray radiation type unidirectional browning means for browning the surface of the article by means of the thermic rays emanating therefrom, said browning means including a plurality of resistive heating elements for generating thermic rays toward said article, said heating elements being arranged in a single layer construction and having a thermic ray-reflecting continuous panel closely associated therewith, each of said resistive heating elements being of the strip type having two directionally opposed thermic ray radiation surfaces which provide two broad heating surfaces relative to the thickness of said heating element, one of said surfaces facing the article for direct application of the thermic rays therefrom to said article, said other surface facing the reflecting panel without any elements being disposed therebetween, thereby directing the thermic rays from said other surfaces in the same direction as that of said direct application of thermic rays, said surface of the browning



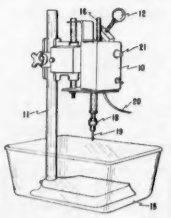
means which faces the article being provided with an electrically conductive net so that the thermic ray radiation type unidirectional browning means is substantially housed by the thermic ray reflecting panel at one surface and by said electrically conductive net at the other surface, said ray reflecting panel being disposed between the microwave generator means and the one surface of said ray reflecting browning means and said electrically conductive net being disposed between the other surface of said ray reflecting browning means and the article to be cooked, means for supplying power to the thermic ray radiation type browner means, and a solid partition wall extending a substantial distance across the oven chamber and disposed between the microwave generator and the reflecting panel, said partition preventing ready access of vapor or hot atmosphere to the upper wall of the oven chamber and to the microwave generator.

3,878,351

DEVICE FOR APPLYING ELECTRODE TO A WORKPIECE FOR SPARK TREATMENT OF THE WORKPIECE

Isadore J. Rocklin, 3240 Douglas St., Sioux City, Iowa 51104

Filed Feb. 13, 1973, Ser. No. 332,216
Int. Cl. B23p *1/08*
U.S. Cl. 219—69 G **7 Claims**



1. An electrical discharge machining device for spark treatment of a workpiece comprising: an electrode, a workpiece, means to move the electrode toward and away from the workpiece, capacitive discharge power supply means connected between the electrode and workpiece, monitoring means including a light means to indicate proper operation of the device whereby: a no contact condition between the electrode

and workpiece is indicated by a bright light from said light means; proper sparking condition between the electrode and workpiece is indicated by a blinking light from said light means; and a shorted condition between the electrode and workpiece is indicated by no illumination of said light means.

3,878,352

ELECTRICAL DISCHARGE MACHINE WITH EVOLVED-GAS DETOXIFICATION

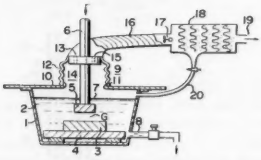
Kiyoshi Inoue, Tokyo, Japan, assignor to Inoue-Japax Research Incorporated, Yokohama, Japan

Filed Apr. 22, 1974, Ser. No. 463,102

Claims priority, application Japan, Apr. 21, 1973, 48-61893; Aug. 21, 1973, 48-61879

Int. Cl. B23p *1/08*

U.S. Cl. 219—69 D **9 Claims**



1. An electrical-discharge machine including:

a work tank for receiving a machining liquid in which electrical discharge machining is carried out across a machining gap;

cover means associated with said work tank for defining a chamber with the surface of said machining liquid and collecting in said chamber discharge-produced fluid evolved from said machining gap;

conduit means communicating said chamber with the atmosphere;

suction means in said conduit means for drawing said fluid from said chamber and maintaining the latter at a subatmospheric pressure; and

fluid-clarifying means in said conduit means for converting said fluid drawn from said chamber into a clean air and permitting the latter to be discharged into the atmosphere.

3,878,353

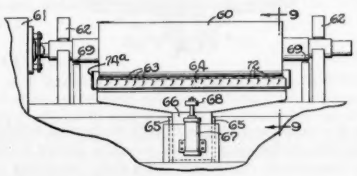
METHOD FOR FINISHING ROLLS

Alex Lennart Anderson, Rockford, Ill., assignor to The Ingersoll Milling Machine Company, Rockford, Ill.

Division of Ser. No. 180,551, Sept. 9, 1971, Pat. No. 3,800,117, which is a continuation-in-part of Ser. No. 781,388, Dec. 5, 1968, abandoned. This application Dec. 10, 1973, Ser. No. 423,254

Int. Cl. B23k *9/16*

U.S. Cl. 219—69 M **20 Claims**



1. A method of finishing an eleongated working surface of a roll subject to axially and circumferentially distributed low radius defect areas to an ultimately desired design roll contour of substantially perfect cross-section circularity, said method comprising the steps of

rotating the roll with respect to a substantially equally elongated narrow electrode tool positioned parallel to the roll axis having an edge contoured to complement the ultimately desired contour for said roll working surface, said edge being adjacent to but slightly spaced from said working surface;

supplying a series of uniform over-voltage initiated discharges between the electrode and the roll working surface to remove particles from the working surface areas successively least distant from the electrode tool by discharge machining; and

moving said electrode tool toward the axis of the roll working surface to maintain a substantially constant gap between the electrode edge and the successively least distant areas of said working surface as particles are removed from the roll working surface while continuing the supply of discharges until particles have been removed from the entire roll working surface to thereby impart a matte texture to said workinig surface, provide substantially perfect cross-sectional circularity for said working surface, and substantially conform said working surface to said ultimately desired contour.

3,878,354

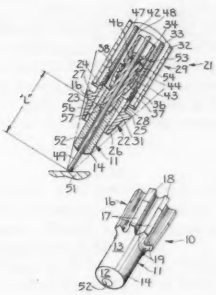
WELDING GUN CHUCK ASSEMBLY

John G. Frantzreb, Sr., Peoria, Ill., assignor to Caterpillar Tractor Company, Peoria, Ill.

Filed June 1, 1973, Ser. No. 366,129

Int. Cl. B23k *9/16*

U.S. Cl. 219—74 **9 Claims**



1. A chuck assembly for a welding gun including nozzle means detachably mounted within said chuck assembly and guide means for guiding the electrode stickout portion of a weld wire employed with said welding gun seated within said nozzle means, said guide means extending substantially beyond said nozzle in a direction anteriorly of said chuck assembly to guide and support the weld wire as it extends beyond said nozzle.

3,878,355

APPARATUS FOR ASSEMBLING PIVOT JOINTS

John R. Andrew, Columbus, and Victor R. McEowen, Worthington, both of Ohio, assignors to The Columbus Auto Parts Company, Columbus, Ohio

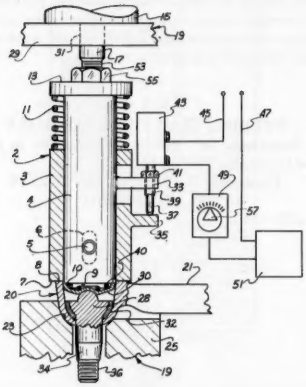
Continuation-in-part of Ser. No. 357,393, May 4, 1973, abandoned. This application Dec. 20, 1973, Ser. No. 426,609

Int. Cl. B23k *11/00*

U.S. Cl. 219—79 **11 Claims**

1. An apparatus for assembling pivot joints of the type that include first and second housing portions joined to one another at junction forming edges, spaced inner housing surfaces and internal elements including a pivotal head between said surfaces, said pivot joints being characterized by a predetermined dimensional tolerance between said internal elements

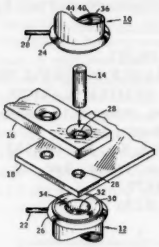
of the joints, said apparatus comprising, frame means including a lower frame portion for supporting one of said housing portions with said internal elements stacked therein; an upper frame portion; height differential sensing means on said upper frame portion for determining the height differential between the junction forming edge of said one housing portion and the top of said stacked internal elements; welding means including confronting electrodes for supporting said housing portions in

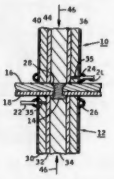


engagement at an unfused junction, and for applying electrical energy to effect burn-down of said junction forming edges to a fused junction located at a burn-down dimension from said location of said unfused junction; and control means for varying the output of electrical energy from said welding means and resulting burn-down dimension responsive to variations in the height differential dimension detected by said height differential sensing means.

3,878,356
DIFFUSION BAND RIVETING METHOD
Cleveland E. Roye, 2544 Bancroft Dr., Spring Valley, Calif. 92077
Division of Ser. No. 401,526, Sept. 27, 1973. This application July 17, 1974, Ser. No. 489,344
Int. Cl. B21j *5/08*
U.S. Cl. 219—150 V **3 Claims**

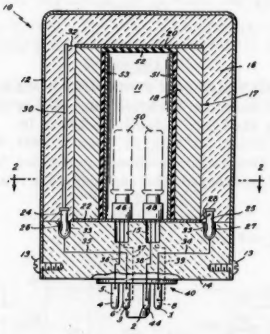
1. A diffusion bond riveting method which comprises:
inserting a rivet into a hole through a metal object to be riveted;
heating said rivet and the hole walls to a diffusion bonding temperature; and
squeezing the ends of said rivet toward each other to expand





said rivet into intimate contact with the hole walls, whereby diffusion bonding occurs.

3,878,357
COMPONENT OVEN
Leo Marcoux, Pawtucket, R.I., assignor to Texas Instructments Incorporated, Dallas, Tex.
Division of Ser. No. 508,643, Oct. 24, 1965, which is a continuation-in-part of Ser. No. 435,166, Feb. 25, 1965, abandoned. This application Nov. 29, 1968, Ser. No. 779,839
Int. Cl. H05b *1/00*
U.S. Cl. 219—209 **4 Claims**



1. An electronic assembly with built-in thermal regulation, said assembly including a thermo-sensitive device having a positive temperature coefficient and a sharp resistance variation in a regulation range located on both sides of a critical reference temperature; said device being shaped as a solid block having a plane warm face; at least one electronic component mounted on said plane face and electrically insulated therefrom, and means for applying electric power to said solid block independently of said component.

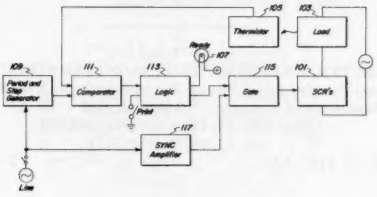
3,878,358
DIGITAL POWER CONTROL

Edward D. Barton, and James M. Donohue, both of Rochester, NY, assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 307,302, Nov. 16, 1972, abandoned. This application June 10, 1974, Ser. No. 478,006

Int. Cl. H05b *1/02*

U.S. Cl. 219—216 **9 Claims**



1. In a xerographic machine operable in three separate modes of warmup, standby, and print and having control apparatus for regulating the temperature of a fusing device during the modes, said control apparatus comprising,

means responsive to the temperature of the fusing device for providing a temperature signal which varies as a function of the temperature,

binary-counter means having an input and a plurality of outputs, with the outputs changing in response to variations in AC signals applied to the input, which are related to variations of AC energy coupled to the fusing device, generator means coupled to the outputs of the binary-counter means to generate a periodic series of electrical signals, the length of each signal being substantially equal in time to one full cycle of the AC signals,

means for comparing the temperature signal and the periodic signals to generate a difference signal indicative of the difference between the temperature and periodic signals,

switching means actuatable to couple an AC energy source to the fusing device, and

gating means coupled to the input of the switching means and responsive to the binary-counter means and the comparator means for applying a different combination of actuating signals to the switching means, for the different modes of the xerographic machine, to couple a number of full cycles of AC energy to the fusing device corresponding to the combination of actuating signals.

3,878,359
DEVICE FOR LIGHTING CIGARETTES, FOR SPECIAL APPLICATION IN AUTOMOTORS

Francisco Carlos Salvador Jannello, Cangallo 2448, Mendoza, Argentina

Filed Mar. 6, 1974, Ser. No. 448,698

Claims priority, application Argentina, Mar. 14, 1973, 247052

Int. Cl. F23g *7/00*

U.S. Cl. 219—261 **3 Claims**

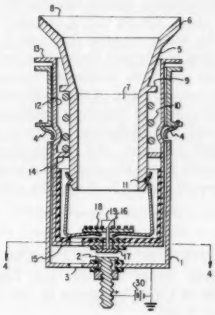
1. In a device for lighting cigarettes for installation in a panel of an automotive vehicle, including a fixed housing (**1**) securely affixed in said panel and a removable assembly (**5**) fitted into the fixed housing when electric power is supplied thereto and manually removable from the fixed housing for use in lighting cigarettes,

the improved removable assembly comprising:

A. a removable housing (**12**) sized to fit smoothly into the fixed housing and including therein an electric terminal (**17**) electrically isolated from the main body of the removable housing, wherein an electric potential may be applied between the terminal and the main body,

B. an electric heating element (**18**) including two electrical ends thereof, the heating element being fixedly mounted within the removable housing and having one of its electrical ends in good electrical contact with the electric terminal (**17**), the heating element being electrically insulated from said main body,

C. bimetallic hooking means (**21**) fixedly mounted within the removable housing and being in good electrical contact with the other electrical end of the heating element,



D. a spring-biased hollow electrically conductive element (**6**) including a groove (**11**) placed to be hooked by the hooking means, whereby the hooking means engages the grooves only when the heating element and therefore the hooking means are not heated sufficiently to deform the hooking means and release the groove, and wherein the hollow element is spring biased away from the hooking means when the hooking means release the grooves, the hollow element being in good electrical contact with the main body of the removable housing.

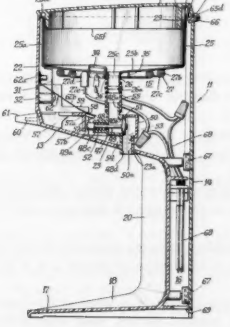
3,878,360
LIQUID HEATING AND DISPENSING APPLIANCE

Robert J. Augustine, Downers Grove; Jean P. Du Bois, Villa Park, and Joseph L. Vieceli, LaGrange, all of Ill., assignors to Sunbeam Corporation, Chicago, Ill.

Filed Aug. 31, 1973, Ser. No. 393,411

Int. Cl. H05b *1/02*; **F24h** *1/18*; **B67d** *5/62*

U.S. Cl. 219—312 **8 Claims**



1. A water heating appliance comprising a housing of plastic heat insulating material having a base, a support extending

upwardly from said base, and a reservoir enclosing portion; said base including means for supporting a small open vessel adjacent to said support; said reservoir enclosing portion having a top wall with an opening formed therein and a closure for said opening; a lightweight reservoir of drawn sheet metal having a low heat capacity and being cup shaped with a mouth provided with an outwardly extending peripheral flange; said reservoir being received in said reservoir enclosing portion with said flange in sealed engagement with said top wall; a sheathed heating element having a wattage in excess of 1,000 watts brazed to the bottom of said reservoir; a manually resettable thermostatic switch secured to said reservoir and responsive to open the electrical circuit to said heating element when the water in said reservoir is at a temperature below the boiling point; said thermostat being mounted in the bottom of said reservoir extending through an opening to respond to the temperature of the water within said reservoir; a bottom outlet in said reservoir; manually operable valve means connected to said bottom outlet to control the flow of water from said reservoir and having dispensing means extending outwardly from said reservoir enclosing portion above said vessel support means to discharge water into said vessel.

3,878,361

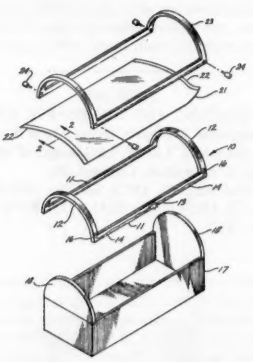
BODY COVERING AND WARMING APPARATUS

Berton P. Levin, Santa Monica, and Darrell D. Stoddard, Malibu, both of Calif., assignors to The Sierracin Corporation, Sylmar, Calif.

Continuation of Ser. No. 375,673, July 2, 1973, abandoned, which is a continuation-in-part of Ser. No. 188,312, Oct. 12, 1971, abandoned. This application July 1, 1974, Ser. No. 484,441

Int. Cl. H05b *3/34*

U.S. Cl. 219—522 **21 Claims**



1. A body covering and warming apparatus comprising:

a transparent flexible electrical heater element having a thickness of up to about 30 mils and sufficient flexiblity to lie substantially flat on a flat surface and curve in either direction over a curved surface under its own weight comprising:

a first flexible transparent plastic sheet having an elastic modulus in the range of about 1.8×10^5 to 4.5×10^5 psi,

a second flexible transparent plastic sheet having an elastic modulus in the range of about 1.8×10^5 to 4.5×10^5 psi,

an electrically conductive layer sandwiched between the first and second sheets, said conductive layer being sufficiently thin to be transparent and having at least a portion adjacent each of a pair of opposite side edges extending beyond the edge of one of the plastic sheets, and

flexible bus bar means for making substantially continuous electrical contact with the conductive layer along said opposite side edges;

support means for removably mechanically supporting a pair of opposed side edges of the heater element in substantially fixed position and forcing the central portion of the flexible heater element to arch therebetween said heater element being mounted on the support means in an arched shape; and

electrical means on the support means for electrical contact with the bus bar means.

3,878,362

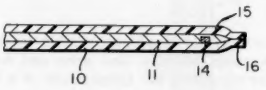
ELECTRIC HEATER HAVING LAMINATED STRUCTURE

Henry Joseph Stinger, Devon, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 15, 1974, Ser. No. 442,907

Int. Cl. H05b *3/34*, *3/54*

U.S. Cl. 219—528 **3 Claims**



1. A laminated structure useful as an electric heating element which comprises

A. a bottom layer composed of a film of electrically insulating polymeric material,

B. in superposed adherent relation with layer(A), a discontinuous layer of electrically conductive elastomeric material containing electrically conductive carbon black dispersed in a fluorocarbon elastomer, said discontinuous layer covering substantially all of layer(A) except for spacing areas which occur at predetermined intervals along the length of layer(A), said spacing areas extending across the width of layer(A) whereby layer(B) is divided into a series of coated areas of predetermined length, layer(B) having a thickness of about 0.05–0.45 mil,

C. at least two spaced-apart conductor wires in intimate contact with layer(B) and extending substantially the entire length of the laminated structure, and bonded within the structure between layers(A) and (D), and

D. a top layer composed of a film of electrically insulating polymeric material in superposed adherent contact with layer(B) and said spacing areas of layer(A),

each of said layers(A) and (D) being a film of a highly flexible non-elastomeric durable plastic material having a thickness of about 0.5–15 mils, and

said coated areas of layer(B) measuring about 11–15 inches, and said spacing areas measuring about 1–5 inches in the direction parallel with the conductor wires.

3,878,363

TIME AND DISTANCE RALLY COMPUTER

Raymond G. Terwilliger, 9360 Sandrock Rd., Eden, N.Y. 14057

Filed July 10, 1974, Ser. No. 486,964

Int. Cl. G06c *27/00*

U.S. Cl. 235—61 V **6 Claims**

1. A time and distance computer comprising:

a frame;

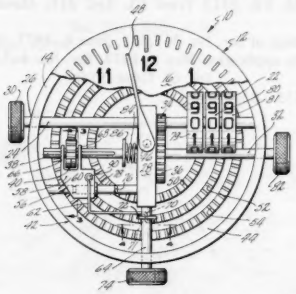
rotatable shaft means connected to said frame;

a distance indicator connected to said shaft means and operable by rotation of said shaft means;

a time increment indicator connected to said frame and rotatably mounted relative thereto including at least one gear teeth ring fixedly and concentrically disposed about the axis of rotation of said time increment indicator, said shaft means including at least one input gear movable parallel to the plane of said ring and engageable with said ring, the total number of said rings plus said input gears

being greater than two, each engageable combination of said input gears and said rings having a different gear ratio representative of a different rate of speed; and

shift means connected to said shaft means for selectively engaging said engageable combinations of said input gears with said rings, said shaft means being manually rotatable for making incremental changes in the reading of said distance indicator, the reading of said time increment indicator changing in response to an incremental change in the reading of said distance indicator by an amount equal to the amount of time it would take to travel said incremental distance at the selected rate of speed, said distance indicator being manually disengageable from said time increment indicator, and when disengaged each indicator may be adjusted without effecting a change in the reading of the other.



3,878,364

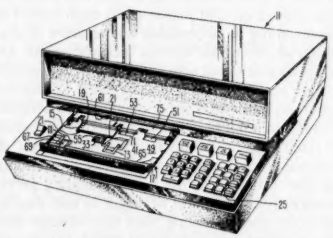
MEDIA TRAY FOR USE IN A CREDIT AUTHORIZATION TERMINAL OF A DATA PROCESSING SYSTEM

Ronald H. Mack, Plymouth, and Donald L. Bumgardner, South Lyon, both of Mich., assignors to Burroughs Corporation, Detroit, Mich.

Filed Mar. 29, 1974, Ser. No. 456,300

Int. Cl. G06k *15/00, 7/08*

U.S. Cl. 235—61.7 B **25 Claims**



1. A till-like document tray associated with supporting and guideway structure of a data processing terminal unit for translation as between a media receiving position and a media processing position therein, said document tray being effective for positionably receiving a multi-sheet document and a magnetic stripe credit card in a web member thereof, for removing the curl of the sheets of said multi-sheet document during the translation of said tray to said media processing position, and for securably holding the document relative to said web member during the printable transfer of output data thereto when said tray is in its said media processing position such that said data may be legibly recorded thereon, said document tray comprising:

a. first means accessible when said tray is in its said media receiving position for limitably positioning said multi-sheet document relative to said web member such that said data may be printably and legibly transferred thereto, said first means including a pivotally and translatably activatable bail,

b. second means accessible when said tray is in its said media receiving position for limitably positioning said magnetic stripe credit card relative to said web member,

c. third means cooperating with said magnetic stripe credit card, with said multi-sheet document, and with said supporting and guideway structure to prevent the translation of said tray from its said media receiving position to its said media processing position whenever either a said multi-sheet document or a said magnetic stripe credit card is not limitably positioned relative to said web member within said tray, and

d. fourth means coupled to said bail and effective for pivotally and translatably activating said bail as between an elevated document receiving and releasing position and a lowered document engaging and curl removing position, said fourth means cooperating with said supporting and guideway structure to lower said bail to its document engaging and curl removing position when said document tray is manually translated from its said media receiving position to its said media processing position, and to elevate said bail from its said document engaging and curl removing position to its said document receiving and releasing position when said document tray is automatically translated from its said media processing position to its said media receiving position upon the completion of media processing.

3,878,365

METHOD AND APPARATUS FOR SPOT CHECKING A CHECKOUT CASHIER OPERATION IN A STORE

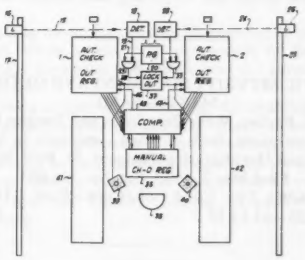
Hermann Schwartz, Schutzenstrasse 18, Pfaffikon, Switzerland

Filed Oct. 26, 1973, Ser. No. 410,013

Claims priority, application Switzerland, Nov. 3, 1972, 16059/72

Int. Cl. G06k *5/00, 15/02*

U.S. Cl. 235—61.7 R **12 Claims**



8. Apparatus for spot checking the cashier operation of a self-service store in which information carriers, each pertaining to a purchased article, are fed to an automatic register by the customer to provide a summary of at least the prices of said articles and the total price, comprising:

means for generating a pulse in response to passage of each customer or in response to required action by each customer on his way to a cashier position, thereby providing a random first series of pulses;

pulse generating means for producing a second series of pulses;

gate means for producing a coincidence signal whenever a pulse of said second series is present during a pulse of said first series;

means responsive to said coincidence signal for blocking the normal output display or printout of said automatic register, and

means operated by a manual checkout means for comparing at least one result produced by said automatic register with a corresponding result produced by said manual checkout means.

3,878,366

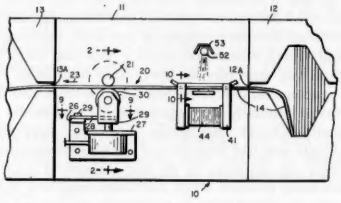
PERFORATED TAPE READOUT SYSTEMS

James E. D. Austin, Southbridge, Mass., assignor to Data General Corporation, Southboro, Mass.

Continuation of Ser. No. 297,051, Oct. 12, 1972, abandoned. This application May 24, 1974, Ser. No. 472,972

Int. Cl. B65h *23/18*; **G06k** *13/22*; **G11b** *15/56*; **G06k** *7/10*

U.S. Cl. 235—61.11 E **15 Claims**



2. In a tape reading system: means for braking the movement of tape through the system; said braking means comprising an electromagnet coupled to magnetizable supports separated from each other and forming poles of the electromagnet; means for guiding a tape over said supports; a magnetizable material keeper member positionable for holding a tape on the supports; means for providing energy to energize the electromagnet to brake tape movement by drawing the keeper towards the supports to hold the tape against the supports; a sensor unit comprising a plurality of sensors for detecting the presence of light passing through the tape, the sensor unit fixedly secured to the keeper and positioned with respect to the keeper such that the tape will be guided therebetween, and; flexure means for supporting said keeper and sensor means.

3,878,367

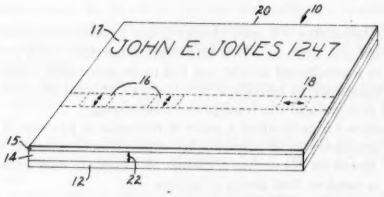
MAGNETIC SECURITY DOCUMENT AND METHOD FOR MAKING SAME

Richard E. Fayling, White Bear Lake, and Douglas D. Campbell, Minneapolis, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 2, 1973, Ser. No. 356,603

Int. Cl. G06k *7/08*; **G01d** *5/06*; **G06k** *19/06*; **G11b** *5/02*

U.S. Cl. 235—61.12 M **12 Claims**



1. A security document having visible indicia characteristic of an intended use thereof, which document includes a magnetic recording layer comprising uniformly dispersed magnetizable material having magnetic anisotropy, wherein the magnetizable material at a plurality of selected locations in the layer is differently physically aligned from the physical alignment of the magnetizable material at a reference location in the layer to provide a magnetically detectable permanent fixed information code pattern.

3,878,368

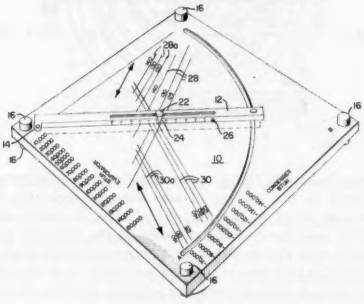
SELECTOR

William M. Ell, 5513 Trent Ct. Apt. 211, Alexandria, Va. 22311

Continuation of Ser. No. 367,412, June 6, 1973, abandoned. This application May 6, 1974, Ser. No. 467,580

Int. Cl. G06c *3/00*

U.S. Cl. 235—83 **8 Claims**

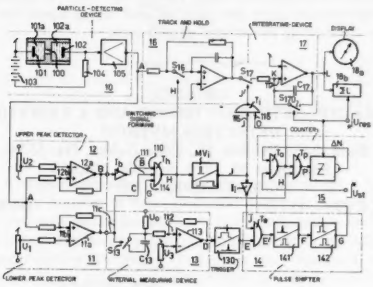


1. A selector for selecting a second thermodynamic element for use with a preselected first thermodynamic element of a thermodynamic circuit, such as an air conditioning installation, by reference to the B.T.U.H. capacities of and/or temperatures to and from the thermodynamic elements: said selector comprising a planar chart including indicia along at least one half-line extending from a point of origin, the indicia expressing the thermodynamic capacities in B.T.U.H. from 0 at said point of origin to a maximum for any selected first thermodynamic element for which a suitable second thermodynamic element is to be selected, at least one set of constant temperature curves on said planar chart each line of said set of lines representing an acceptable temperature of discharge of the refrigerant from said second thermodynamic element, at least one pivotable radial arm extending from a pivot at said point of origin and of a length at least equal to said half-line, a datum point on said radial arm indicating 100 percent of the distance from said point of origin to the indicia expressing the maximum rated capacity of any first thermodynamic element that may be preselected, a first scale of indicia extending along said radial arm from said datum point indicating percentages of the distance from said point of origin to said datum point, said datum point also indicating, on a second scale along said pivotal arm a datum temperature at which refrigerant from said first thermodynamic unit enters said second thermodynamic unit at the "rated" capacity of said first thermodynamic unit, said second scale along said radial arm indicating temperatures of the refrigerant entering said second thermodynamic element from said first thermodynamic element when used at percentages of the rated capacity of said first thermodynamic element as indicated on said first scale; whereby it may be determined by pivoting said arm to place the datum point on the line normal to said half line opposite the indicia thereon indicating the rated thermodynamic capacity of said first preselected thermodynamic element, whether the second thermodynamic element represented by said set of constant temperature curves will be suitable for use with said first thermodynamic element.

3,878,369
METHOD AND APPARATUS FOR PRODUCING A MAGNITUDE PROPORTIONAL TO THE AVERAGE AMPLITUDE OF EVALUATED INPUT PULSES OF A MULTIPLICITY OF INPUT PULSES

Hermann Gahwiler, Zurich, Switzerland, assignor to Contraves AF, Zurich, Switzerland

Filed Sept. 12, 1972, Ser. No. 288,421
Claims priority, application Switzerland, Nov. 9, 1971, 16246/71
Int. Cl. G05m *11/64*
U.S. Cl. 235—92 PC 6 Claims

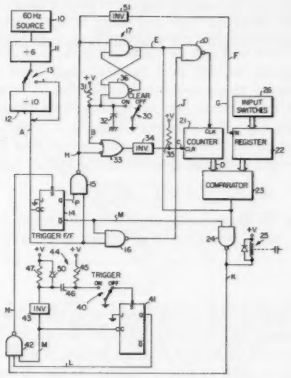


1. An apparatus for producing a magnitude proportional to the average pulse amplitude of evaluated input pulses of a multiplicity of input pulses, comprising particle detecting-pulse transmitter means including an output for generating the input pulses, pulse amplitude-storage means having a pulse input which is connected to the output of said pulse transmitter means, a pulse amplitude-summation device connected after said pulse amplitude-storage means, said pulse amplitude-storage means being provided with a signal-controlled switching mechanism connected between said pulse input and said pulse amplitude-storage means, a peak comparator having an input and output, said peak comparator having its input connected in circuit with said pulse input of said pulse amplitude-storage means, said peak comparator producing a logic signal at its output during the time when each input pulse received from said pulse transmitter means exceeds a pre-adjustable minimum amplitude, a time interval-measuring device including an input and an output, the input of said time interval-measuring device being in circuit with said output of said peak comparator, said time interval-measuring device serving to generate at its output a trigger pulse during the switch-in time of each logic signal received from said peak comparator provided that there has expired a pre-adjustable minimum duration since the last generated trigger pulse, a pulse displacement mechanism having an input and an output, the input of said pulse displacement mechanism being connected with the output of the time interval-measuring device for generating control pulses of predetermined duration and predetermined time displacement with respect to the trigger pulses, a first logic gate having a plurality of inputs and an output, one of said inputs being connected with the output of the peak comparator for receiving the output logic signal of said peak comparator, another of said inputs of said first logic gate being connected with the output of the pulse displacement mechanism for receiving output control pulses generated by said pulse displacement mechanism, the output of said first logic gate being in circuit with the signal-controlled switching mechanism for applying a switching signal to said signal-controlled switching mechanism during the presence of both a logic signal from the peak comparator and a control pulse from the pulse displacement mechanism.

3,878,370
ELECTRONIC INTERVAL TIMER

Anthony Santomango, West Peabody, and Nicholas N. Hatheway, Jr., Newbury, both of Mass., assignors to Artronics Corporation, North Andover, Mass.

Filed Sept. 4, 1973, Ser. No. 393,725
Int. Cl. G06m *3/12*
U.S. Cl. 235—92 T 4 Claims



1. An interval timing unit with a source of clock pulses, a counter for transmitting signals representing an interval being timed, a register for transmitting time interval signals representing a number stored therein corresponding to the interval to be timed, a comparator connected to receive signals from the counter and register, the comparator including means for transmitting first and second signals when the counter and register signals are unequal other than equal and, respectively, and output means energized in response to the first signal, the improvement of a starting circuit comprising:

a switch means;

means connected to the comparator and said switch means for generating a trigger pulse when said switch means is actuated while the comparator transmits the second signal;

input gating means for coupling, in response to an enabling signal, clock pulses from the source to the counter whereby the signals from the counter are altered periodically; and

an enabling circuit for transmitting the enabling signal to said gating means, said enabling circuit including means responsive to a first clock pulse after said trigger pulse generating means transmits a trigger pulse for clearing the counter, thereby causing the comparator to transmit the first signal and thereby enabling the counter to begin counting.

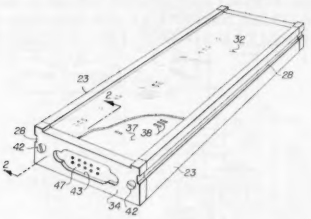
3,878,371
APPARATUS AND METHOD FOR COMPILING AND RECORDING OPERATING DATA ON EQUIPMENT

Harry E. Burke, 199 First St., Redwood City, Calif. 94022

Filed Feb. 7, 1973, Ser. No. 330,246
Int. Cl. G07c *3/10*
U.S. Cl. 235—92 PD 4 Claims

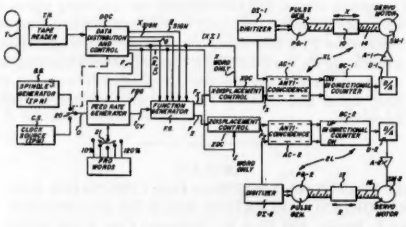
1. Apparatus for compiling and recording operating data of a plurality of different operating parameters of a piece of equipment, a first said parameter being duration of operation of a function of said equipment, a second said parameter being the number of times an operation of a function of said equipment occurs, the piece of equipment including a plurality of transducers corresponding to each of said parameters for generating electric pulses each time each of said operating parameter operates, said apparatus comprising a casing having

an outer surface and a central cavity and being adapted for removable mounting on the piece of equipment, means on the outer surface of said casing for positioning a computer punch card punched to identify the piece of equipment and each of said operating parameters, means disposed within said cavity comprising a plurality of channels, each said channel having a circuit for counting and storing pulses from one of said transducers, said casing having a plurality of externally accessible terminals for effecting inter-connections between said counting means and said transducers so that said casing can be periodically removed from the piece of equipment to permit readout into a computer of the indicia on said punch card and



said terminals further being interconnectable with computer readout means and each said channel having means to effect readout by said computer readout means of each of the numbers stored in each of said counting means, at least one said pulse counting and storing means comprising an AND gate having at least first and second input terminals and an output terminal, one of said transducers being connected to said first input terminal, a clock pulse generator connected to said second input terminal, and a counter connected to said second input terminal, and a counter connected to said output terminal so that the contents of said counter is representative of the time duration that the parameter operates.

3,878,372
IMPROVED FEED RATE GENERATOR FOR MACHINE TOOL CONTROL
Emmett F. Sindelar, Moreland Hills, Ohio, assignor to The Warner & Swasey Company, Cleveland, Ohio
Filed Aug. 29, 1973, Ser. No. 392,680
Int. Cl. G05b *19/18;* **G06f** *15/46*
U.S. Cl. 235—151.11 **22 Claims**



1. A control for controlling movement of a machine tool along a path in accordance with commanded departure distances along mutually perpendicular first and second axis and at a velocity in accordance with a commanded vectorial velocity wherein the path is dependent upon the vectorial summation of the commanded departure distances, comprising:

means for providing a train of pulses at a first pulse rate,

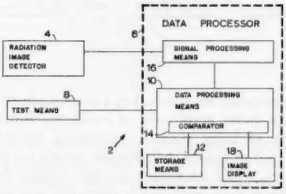
means for generating first and second signals which have values which are respectively a function of the value of the commanded departure distance along said first axis and the value of the commanded departure distance along said second axis,

means for receiving said first and second signals for directly calculating from the values of only said first and second signals and in accordance with a fixed format independently of the relative values of said first and second signals the value of the square root of the sum of the squares of the values of said first and second signals and providing a third signal having a value in accordance with said calculation,

means for generating a fourth signal having a value corresponding to the ratio of a function of the value of the commanded vectorial velocity to the value of said third signal, and

means for varying the pulse rate of said train of pulses in dependence upon the value of said fourth signal for use in controlling movement of said tool.

3,878,373
RADIATION DETECTION DEVICE AND A RADIATION DETECTION METHOD
Alvin Blum, 2350 Del Mar Pl., Coral Gables, Fla. 33301
Filed June 30, 1971, Ser. No. 158,503
Int. Cl. G01n *23/00*
U.S. Cl. 235—151.3 **6 Claims**



1. A radiation detection device for surveying the distribution of a distributed radiation source to derive the location of a plurality of radiation sources comprising,

a layer of scintillation material in the path of the radiation emissions from the radiation source for receiving the radiation to provide light indications, said layer of scintillation material includes a front face adjacent the radiation source,

a plurality of photodetectors disposed in view of said scintillation material for detecting the light indications in said scintillation material,

a data processor connection to said photodetectors, said data processor including storage means, comparator means, a storage reviewing means, connecting means, and a comparator match indication means,

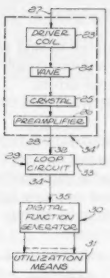
said storage means including, a plurality of response data records from said radiation detection device when said scintillation material was engaged by emissions from a known radiation source location with the known radiation source location data for each response,

said connecting means connecting said photodetectors to said comparator means to connect response data from an unknown radiation source location with said comparator means, said connecting means connecting said storage reviewing means to said storage means to review said stored data, and said connecting means connecting said comparator means to said storage means to match said response data from an unknown radiation source location with a particular piece of stored response data from a known radiation source location, said match indication means connected to said comparator for indicating a match and reading out the stored location data.

3,878,374
DENSITOMETER

Gerald Lance Schlatter, Boulder, Colo., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Dec. 10, 1973, Ser. No. 423,409
Int. Cl. G06f *15/34*; G01n *9/00*
U.S. Cl. 235—151.3 **41 Claims**



1. A digital vibration densitometer comprising: a probe including a housing, a vane, electrical means having an input lead, and a detector having an output lead, said vane being mounted on said housing, said electrical means being mounted on said housing and being responsive to a feedback signal impressed upon said input lead thereof to vibrate said vane, said detector being mounted on said housing in a position to receive vibrations of said vane, said detector producing an output signal on said output lead thereof responsive to receipt of vibrations from said vane, said output signal having an A.C. component of a frequency equal to the vibrational frequency of said vane; first means having input and output leads, said first means input lead being connected from said detector output lead to produce a periodic signal on said first means output lead of a fundamental frequency equal to said vibrational frequency; second means having input and output leads, said second means input lead being connected from said first means output lead to said electrical means input lead to impress said feedback signal thereon, said feedback signal providing positive feedback to cause said probe and said first and second means to act as a closed loop electromechanical oscillator, at least one of said first and second means including an amplifier, at least one of said first and second means being constructed to provide gain for said loop to overcome damping of said loop including damping of said vane to an extent such that said electromechanical oscillator oscillates continuously and said vane vibrates continuously; a termainal junction; third means having input and output leads, said third means input and output leads being connected from said first means output lead to said terminal junction, respectively, to impress a square wave on said terminal junction having a pulse repetition frequency (PRF) directly proportional to said fundamental frequency and a mark-to-space ratio of unity; first and second NAND gates, each of said NAND gates having first and second input leads and an output lead; a burst oscillator having a constant PRF large in comparison to that of said square wave; an inverter having an input lead connected from said terminal junction, and an output lead connected to said second gate first input lead, said first gate first lead being connected from said terminal junction, said burst oscillator having an output lead connected to the second lead of each of said first and second gates; a divider having at least a first input lead, and a plurality of outputs leads, said divider acting as a counter and having a storage register with a constant count entered therein during alternate half periods of said square wave, pulses counted by said divider being supplied over said first input lead thereof thereto, said divider first input lead being connected from one of said gate output leads; a first rate multiplier having a plurality of setting input leads connected from respective bits in said divider register, said first rate multiplier having a serial pulse input lead connected from the other of said gate output leads and a serial pulse output lead; a manually adjustable switch matrix having a plurality of output leads; a second rate multiplier having a plurality of setting input leads connected respectively from said matrix output leads, a serial pulse input lead connected from said first rate multiplier serial pulse output lead, and an output lead, said second rate multiplier producing a number of serial pulses on the output lead thereof during said alternate half periods of said square wave directly proportional to AT^2 where A is the constant introduced by adjustment of said switch matrix and T is the period of said square wave, the number of pulses produced serially by said first rate multiplier on the said serial pulse output lead thereof being directly proportional to T^2; an off-set digital computer having at least a first input lead connected from said second rate multiplier serial pulse output lead, said computer having a plurality of output leads and being adapted to produce digital output signals on said output leads thereof directly proportional to the quantity

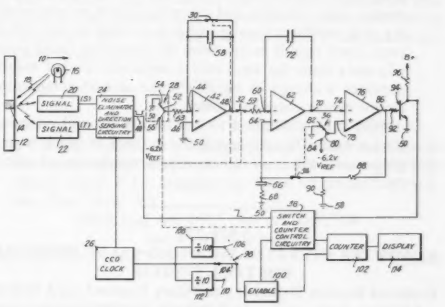
$$AT^2 + B$$

where B is a constant, said computer having an adjustable switch matrix, the adjustment of which varies B.

3,878,375
RAM VELOCITY MEASURING APPARATUS

John Mickowski, 470 Richmond Ave., Maplewood, N.J. 07040

Filed May 10, 1974, Ser. No. 469,047
Int. Cl. G01p *3/36*; G06f *15/20*
U.S. Cl. 235—151.32 **6 Claims**



1. An apparatus for measuring the velocity of an object comprising

a. a primary signal source positioned proximate said object for generating first and second primary signals;

b. means affixed on said object adapted to produce said primary signals for a predetermined length along the direction of motion of said object;

c. first and second circuit means positioned proximate said object for generating a start signal pulse (S) and a timed signal pulse (T) responsive to said first and second primary signals respectively;

d. reference clock circuit means for providing reference timing pulses;

e. direction sensing circuit means coupled to said first and second circuit means and said reference clock circuit means for providing an output pulse responsive to the coincidence of the leading edges of a clock reference timing pulse and a timed signal pulse (T) only when preceded by a start signal pulse (S), said direction sensing output pulse being proportional to the duration of said timed signal pulse;

f. first and second integration circuit means, said integration circuit means having first and second input terminals and an output terminal, said first integration circuit means being coupled to said first input terminal of said second integration circuit means, said first input termial of said

first integration circuit means being coupled to a reference voltage or a ground reference responsive to a switching signal, said first integration circuit means integrating said reference voltage responsive to the duration of said direction sensing output pulse, said second input terminal of said first integration circuit means being coupled to a reference ground, said second integration circuit means being adapted to integrate the voltage appearing at said output terminal at said first integration circuit means;

g. comparator circuit means having first and second input terminals and an output terminal, said comparator means first input terminal being coupled to said second integration circuit means output terminal, said comparator means second input terminal being coupled to said reference voltage or said ground reference responsive to a switching signal, said comparator means output terminal being coupled to said second input terminal of said second integrator circuit means responsive to a switching signal, said comparator circuit means providing a change in output signal voltage at said comparator means output terminal when said comparator means input terminal reaches a predetermined voltage;

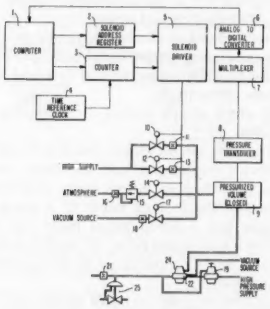
h. switching and counting circuit means, said switching and counting circuit means being coupled to said first integration circuit means, said second integration circuit means and to said comparator circuit means output terminal, said switching and counting circuit means being coupled to said reference clock circuit means and providing said switching pulses and determining the sequence of operation of said first integration circuit means, said second integration circiut means and said comparator circuit means, said switching and counting circuit means counting said reference timing pulses provided by said reference clock circuit means from the time said timed pulse (T) ends until the time said comparator circuit means provides a change in signal voltage at said comparator circuit means output terminal; and

i. display means coupled to said switching and counting circuit means for displaying the number of clock timing pulses counted as an indicia representing units of velocity.

3,878,376
COMPUTER OPERATED SOLENOID VALVE PRESSURE CONTROL SYSTEM

Frederick Gordon Sholes, Jr., and Gary Eugene Lovell, both of Littleton, Colo., assignors to Martin Marietta Corporation, New York, N.Y.

Filed Dec. 17, 1973, Ser. No. 425,663
Int. Cl. G06f *15/20;* **G01p** *5/14*
U.S. Cl. 235—151.34 **16 Claims**



1. A computer operated solenoid valve pressure control system comprising:

a. a computer;

b. a pressurized closed volume;

c. means coupled to said pressurized closed volume for measuring the pressure in said pressurized closed volume;

d. means coupled between said means for measuring said pressure in said pressurized closed volume and said computer for transmitting a signal indicative of said pressure in said pressurized closed volume to said computer;

e. solenoid operated valve means coupled to said pressurized closed volume to change the pressure in said pressurized closed volume;

f. a solenoid driver coupled to said valve means;

g. a solenoid address register coupled between said computer and said solenoid driver;

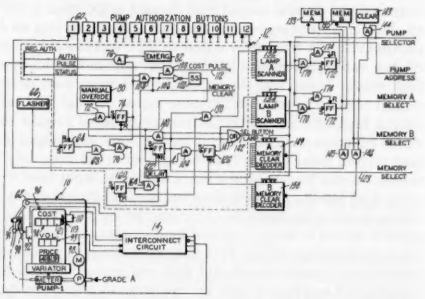
h. a counter coupled between said computer and said solenoid driver; and

i. a time reference clock coupled to said counter, whereby said valve means is caused to open by an address read into said register from said computer for a time period determined by said counter counting impulses from said time reference clock to thereby change said pressure in said pressurized closed volume.

3,878,377
FLUID DELIVERY CONTROL AND REGISTRATION SYSTEM

Peter P. Brunone, Vernon, Conn., assignor to Veeder Industries, Inc., Hartford, Conn.

Filed Sept. 12, 1973, Ser. No. 396,486
Int. Cl. G06f *15/56*
U.S. Cl. 235—151.34 **12 Claims**



1. A multiple delivery station fluid delivery registration system for storing and registering the separate fluid deliveries at a plurality of delivery stations and for selectively controlling each delivery station for delivering fluid comprising pulse generating means associated with each fluid delivery station for generating a pulse for each predetermined incremental amount of fluid delivered at the respective delivery station, electronic storage memory circuit means having a plurality of separate electronic storage memory sections for each delivery station for separately accumulating and storing the amount of each of a corresponding plurality of separate fluid deliveries at the respective delivery station, storage control means for operating the storage memory circuit means for separately accumulating and storing the amount of each of said corresponding plurality of separate fluid deliveries at each delivery station in the corresponding plurality of storage memory sections and in accordance with the number of pulses generated by the respective pulse generating means during the respective fluid deliveries, first manually operable delivery control means manually operable for selectively activating each delivery station for making a single fluid delivery and separately selectively manually operable for each delivery station for selectively operating the storage control means for individually conditioning each corresponding storage memory section for accumulating and storing a subsequent delivery of fluid from

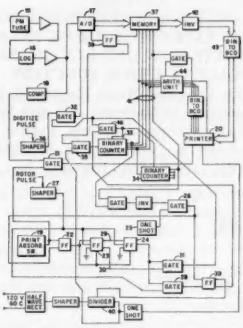
the respective delivery station, the first manually operable means comprising interlock circuit means preventing activation of a delivery station unless at least one of the corresponding memory sections is conditioned for accumulating and storing a subsequent delivery of fluid from the delivery station, register means for individually registering the amount of each fluid delivery from each delivery station stored in the corresponding storage memory sections of the memory circuit means, and second manually operable register control means for selectively operating the register means with the storage memory circuit means for selectively individually registering with the register means the amount of each delivery stored in the storage memory circuit means.

3,878,378

DATA PROCESSOR FOR MULTISTATION PHOTOMETERS

Wayne F. Johnson, Loudon, and Richard A. Mathis, Knoxville, both of Tenn., assignors to The United States of America as represented by the United States Atomic Energy Commission, Washington, D.C.

Filed Oct. 31, 1973, Ser. No. 411,553
Int. Cl. G01n *1/10*
U.S. Cl. 235—151.35 **2 Claims**



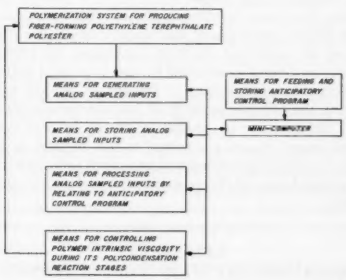
1. In a rotary photometric analyzer device including a plurality of cuvettes positioned in the rotor of said device with each of said cuvettes containing a respective sample to be analyzed, said rotor adapted to provide a rotor pulse for each complete revolution of said rotor and a digitized pulse for each cuvette position of said rotor during rotation thereof, and a photomultiplier tube positioned to receive respective transmittance values of the amount of light transmitted through each of said cuvettes as the rotor of said device is rotated, said tube providing a plurality of sequential output signals therefrom as a function of said transmittance values, the improvement comprising a digital logic system coupled to the output of said photomultiplier tube for processing said output signals received therefrom, said logic system comprising a log converter coupled to the output of said photomultiplier tube, a bipolar scratch pad memory unit, an analog-to-digital converter coupled between the output of said log converter and the input to said memory unit to provide digital signals for sequential storage into said memory unit, a print switch, a first flipflop coupled to said print switch, a timer coupled through a first gate to said first flipflop for enablement thereof, a second flipflop and a third flipflop coupled to the output of said first flipflop, a first pulse shaper for receiving said rotor pulse from said rotor and providing a common clock pulse to said second and third flipflops, a second pulse shaper for receiving said digitized pulses from said cuvette rotor positions, a second gate coupled between said second pulse shaper and said analog-to-digital converter, said second pulse shaper providing gating pulses to said second gate which in turn triggers said converter, a fourth flipflop coupled between said analog-to-digital converter and said memory unit, a binary counter coupled by means of a third gate to the output of said fourth flipflop, the output of said counter coupled to said memory unit to provide the address advance thereto, a fourth gate coupled to the output of said third flipflop, the output of said fourth gate coupled to said second gate for providing a qualifying input thereto, whereby when said print switch is closed and a first rotor pulse is received said digital signals are sequentially stored in said memory unit and said counter is sequentially advanced and upon recipt of a second rotor pulse said counter is reset by means of a fifth gate coupled to the output of said fourth gate while at the same time said fourth gate effects disablement of said second gate, said system further including a printer, an inverter coupled to the output of said memory unit, and a binary-to-binary coded decimal converter coupled between said inverter and said printer, a sixth gate, a fifth flipflop, and a divide-by-thirty counter, said sixth gate coupled to the output of said first pulse shaper and to the output of said third flipflop, said fifth flipflop coupled to the output of said sixth gate and to the output of said first gate, the output of said fifth flipflop coupled to said divide-by-thirty counter, said last-named counter coupled by means of said third gate to said binary counter to again sequentially advance it, said last-named counter also coupled to said printer to provide successive print signals thereto, whereby upon receipt of a third rotor pulse by first pulse shaper said signals stored in said memory unit are sequentially read out therefrom and printed by said printer, after which said system is restored to its initial condition by means of a final signal from said binary counter to said first gate.

3,878,379

POLYMER INTRINSIC VISCOSITY CONTROL

Asa Carlyle Moody, Jr., Colonial Heights; Richard George Kenward, Richmond, both of Va., and James William Shiver, Cary, N.C., assignors to Allied Chemical Corporation, New York, N.Y.

Filed Aug. 14, 1972, Ser. No. 280,710
Int. Cl. G06f *15/46*
U.S. Cl. 235—151.12 **2 Claims**


POLYMERIZATION SYSTEM FOR PRODUCING FIBER-FORMING POLYETHYLENE TEREPHTHALATE POLYESTER
MEANS FOR GENERATING ANALOG SAMPLED INPUTS
MEANS FOR FEEDING AND STORING ANTICIPATORY CONTROL PROGRAM
MEANS FOR STORING ANALOG SAMPLED INPUTS
MINI-COMPUTER
MEANS FOR PROCESSING ANALOG SAMPLED INPUTS BY RELATING TO ANTICIPATORY CONTROL PROGRAM
MEANS FOR CONTROLLING POLYMER INTRINSIC VISCOSITY DURING ITS POLYCONDENSATION REACTION STAGES

1. In a polymerization system for producing fiber-forming polyethylene terephthalate polyester, a control apparatus for automatically controlling polymeric intrinsic viscosity of the fiber-forming polyethylene terephthalate polyester during its polycondensing reaction stages, comprising:

a. a mini-computer, the configurations of which consist of a central processor, a multiple word disk, a teletype, analog inputs, analog outputs, a real time clock, contact closures and a watchdog timer,

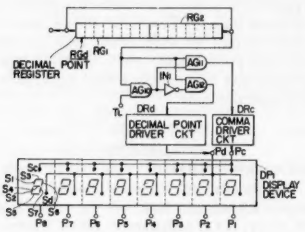
b. feeding and storing means for feeding and storing an anticipatory control program in said minicomputer,

c. generating means for generating sampled data inputs from each reactor of pressure, agitator speed, inlet and outlet melt viscosity, inlet and outlet temperature, and pump speed,
d. generating means for generating analog sampled inputs of physical representations of reactor pressure, agitator speed, inlet and outlet melt viscosity, inlet and outlet temperature, and pump speed,
e. storing means for storing said analog sampled input,
f. processing means for processing said analog sampled inputs by relating said sampled inputs to said anticipatory control program, and
g. controlling means for controlling said polymer intrinsic viscosity during its polycondensing reaction stages within predetermined limits of said anticipatory control program, the intrinsic viscosity of the fiber-forming polyester being controlled within ± 0.005 units.

3,878,380
EXPONENT INDICATING SYSTEM

Takao Tsuiki, Tokyo, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 4, 1973, Ser. No. 403,442
Claims priority, application Japan, Oct. 4, 1972, 47-99044
Int. Cl. G06f *3/14*
U.S. Cl. 235—152 **16 Claims**



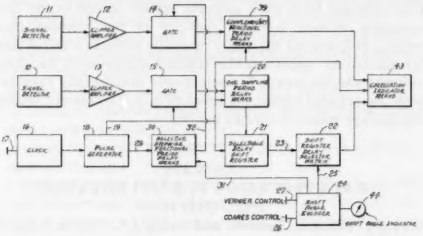
1. An exponent indicating system for use with a numerical display device having a plurality of display positions, a decimal point indicator element for each position and an exponent indicator element, said system comprising a decimal point shift register having a number of stages which exceeds the number of display positions of said display device for storing the position of a decimal point of a number, an exponent indicator driver circuit connected to said exponent indicator element, first means connected to the output of said register for detecting the relative position of said decimal point with respect to the number of display positions in said display device, and second means connected to said register and said first gating means for actuating said exponent indicator driver circuit in dependence on the position of said decimal point in said number.

3,878,381
CORRELATION CIRCUIT INCLUDING VERNIER

Alan Broder, Albertson; Paul Shapiro, Planview, and Seening Yee, Whitestone, all of N.Y., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 7, 1966, Ser. No. 599,974
Int. Cl. G06f *15/34;* **G01s** *3/46*
U.S. Cl. 235—181 **3 Claims**

1. In combination with a pair of gates for sampling substantially identical binary quantized waveforms,
means for unblocking one of the gates at a predetermined sampling rate and for unblocking the other gate at said sampling rate in any selected one of several phase relationships relative to the unblocking of said one gate wherein said several phase relationships include in-phase and out of phase by one of several equal step fractional divisions of the sampling period,
means triggered by the first means in coincidence with the unblocking of the one gate for further delaying the output

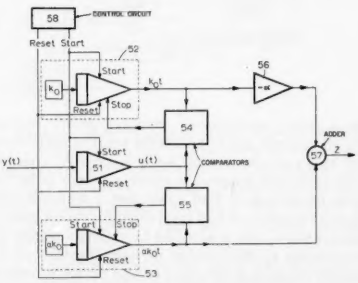


of the other gate by an interval equal to the compliment of the fraction of the sampling period by which the output of the other gate is delayed,
and means triggered by the first means in coincidence with the unblocking of the first gate for delaying the output of the one gate by one sampling period.

3,878,382
APPARATUS FOR DETERMINING SIGNAL MAGNITUDES EXPRESSING THOSE PARAMETERS WHICH INDICATE HOW QUICKLY CHANGES TAKE PLACE IN A TIME FUNCTION

Hakon Einar Bjor, Oslo, and Harek Hognestad, Haslum, both of Norway, assignors to Nortronic A/S and Sentralinstitutt for Industriell, Forskningsveien, Oslo, Norway

Filed Nov. 6, 1973, Ser. No. 413,204
Claims priority, application Norway, Nov. 14, 1972, 4132/72
Int. Cl. G06g *7/18*
U.S. Cl. 235—183 **11 Claims**



1. Apparatus for determining parameters indicative of the rate of change of a time function, comprising:
integrating means for intergrating an input time function;
first and second function generator means for generating respective output signals representing predetermined time functions;
control means coupled to said integrating means and to said first and second function generator means for starting and resetting the respective means;
first comparator means connected to said integrating means and to said first function generator means for determining when the outputs thereof are equal and for stopping said first function generator means when the output of said integrating means exceeds the output of said first comparator means;

second comparator means connected to said integrating means and to said second function generator means for determing when the outputs thereof are equal and for stopping said second function generator means when the output of said integrating means exceeds the output of said second comparator means; and

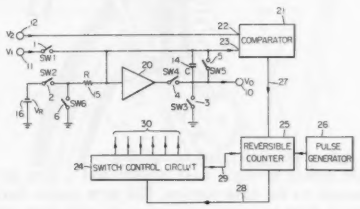
means coupled to said function generator means for producing an output directly proportional to the desired parameters.

3,878,383

SYSTEM FOR CONVERTING A RATIO OF TWO SIGNALS INTO A LOGARITHMIC VALUE

Kozo Uchida, Tokyo, Japan, assignor to Iwatsu Electric Co., Ltd., Tokyo, Japan

Filed Jan. 23, 1973, Ser. No. 325,995
Claims priority, application Japan, Feb. 2, 1972, 47-11328
Int. Cl. G06g *7/18, 7/24*
U.S. Cl. 235—183 **4 Claims**



1. Circuit arrangement for converting a ratio of two input signals to a logarithmic value comprising a first input terminal to which a first input signal is supplied, a second input terminal to which a second input signal is supplied, a common terminal for said first and second input terminals, a capacitor adapted to be charged to a value proportional to said first signal, a first switch (SW_1) which is connected between said first input terminal and said capacitor, a discharging resistor which is connected to said capacitor for discharging said capacitor, a second switch (SW_2) which is connected between said first switch and said discharging switch, a third switch (SW_3) which is connected between said capacitor and ground, an amplifier whose input terminal is connected to a connection point of said resistor and said capacitor and whose output terminal is connected via a fourth switch (SW_4) to a connection point of said capacitor and said third switch, a fifth switch (SW_5) which is connected in parallel to said capacitor, a sixth switch (SW_6) which is connected between ground and a connection point of said second switch and said discharging resistor, an output terminal which is a connection point of said capacitor and said third switch, a comparator whose first input terminal is connected to said first switch, whose second terminal is connected to said second terminal and whose output terminal is connected to a reversible counter, a pulse generator which generates pulses with a predetermined constant period and is connected to said reversible counter, a switch control circuit which is connected to said reversible counter and controls said switches (SW_1–SW_6) in such a manner that:

PERIOD	SW_1	SW_2	SW_3	SW_4	SW_5	SW_6
T_0	ON	OFF	ON	OFF	OFF	ON
T_1	OFF	OFF	ON	OFF	OFF	ON
T_2	OFF	OFF	OFF	ON	ON	ON
T_3	OFF	ON	OFF	ON	OFF	OFF
T_4	OFF	OFF	OFF	ON	OFF	ON

a. when the discharging circuit begins to discharge said capacitor, said switch control circuit sends a signal to said reversible counter which thereupon begins to count forwardly the pulses sent by said pulse generator,

b. when the voltages applied to said first and said second input terminals of said comparator reach an equal value, said comparator sends a signal to said reversible counter so as to stop said counter,

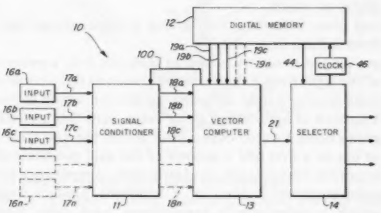
said switch control means constituting a circuit integrating the voltage from said power supply source, and said reversible counter begins to count in reverse the pulses sent by said pulse generator, when the count by said reversible counter becomes zero, the output voltage of said capacitor is held and then the logarithmic value of the ratio between said second input signal and said first input signal is determined by the ratio between the output of said capacitor and said voltage from said electric power source.

3,878,384

GENERAL PURPOSE DESIGNATOR FOR DESIGNATING THE CLASS TO WHICH AN UNKNOWN EVENT BELONGS AMONG A PLURALITY OF POSSIBLE CLASSES OF EVENTS

John Kent Bowker, 4 Elm Pl., Marblehead, Mass. 10945

Continuation-in-part of Ser. No. 181,141, Sept. 3, 1971, Pat. No. 3,778,541. This application Dec. 4, 1973, Ser. No. 421,703
Int. Cl. G06f *15/34*
U.S. Cl. 235—151.3 **19 Claims**



1. Apparatus for designating the class to which an unknown event belongs among a plurality of possible classes of events, which classes differ from one another by the values of one or more of a plurality of selected properties thereof; said apparatus comprising:

a. means for generating a first plurality of signals which identify the position of said unknown event as a function of its selected property values in a multidimensional coordinate system wherein each axis corresponds to a different one of said plurality of selected properties;

b. means for generating a second plurality of signals which identify the position of each of said classes in said multidimensional coordinate system as a function of their values of said selected properties;

c. first comparing means for comparing said first plurality of signals with said second plurality of signals and for generating a third plurality of signals, each of which is proportional to the vector distance between the position of said unknown event and the position of a different one of said classes in said multidimensional coordinate system;

d. second comparing means for comparing said third plurality of signals with one another for determining that third signal which is proportional to the shortest vector distance; and,

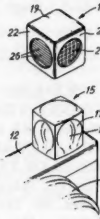
e. means for identifying the particular class associated with the third signal proportional to the shortest vector distance for designating said unknown event into that particular class.

3,878,385

ACCESSORY FOR FLASH PHOTOGRAPHY

Arthur William Kingston, The Old Mill House, Willowbank, Denham, England

Filed June 4, 1973, Ser. No. 366,416
Claims priority, application United Kingdom, June 6, 1972, 026421/72
Int. Cl. G03b 15/02
U.S. Cl. 240—1.3 5 Claims



1. An accessory for a photographic flash cube or flash bar having a structure dimensioned to fit on said flash cube or bar in any one of a number of positions,

said structure comprising a number of light-controlling plates of which

a first plate is formed with a lens to concentrate the light from a flash unit, and

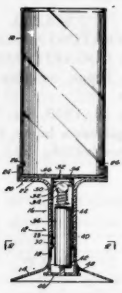
a second plate is constructed to transmit only a proportion of the light from a flash unit, said second light-controlling plate having a light diffusing surface on which is formed a pattern of light-interrupting areas, said first and second plates being located over a flash unit of the said flash cube or bar in a first and a second of the said positions of the structure, respectively, said structure comprising a hollow cube member molded of a synthetic plastics material which is substantially transparent, said cube member having four sides and an open bottom end for close fitting placement over a flash cube with any desired one of the four sides covering the front face of the flash cube, said first plate being a first side of said cube member and having formed therein a Fresnel lens for concentrating the light from the flash cube to increase illumination of a distant photographic subject, said second plate being a second side of said cube member and incorporating a first pattern of barlike elements defining said pattern of light-interrupting areas, the third side of said cube member having a further pattern of barlike elements to transmit a lesser proportion of the light from the flash unit, the fourth side of said cube member being at least substantially transparent to permit unmodified flash cube light output therepast, whereby the cube member can remain on the flash cube for illuminating photographic subjects in the range of distances therefrom including distances greater than, less than, and equal to the normal distance for flash cube operation, subject to reorientation on the flash cube in accord with the subject distance for a given photograph, the second side having a matt diffusing surface and said barlike elements comprise a series of opaque parallel bars printed on such matt diffusing surface, the area of said second side covered by said bars being such as to reduce the light output to about 50 percent of that through said fourth side, said third face also having a matt diffusing surface, said barlike elements of said third face comprising an opaque grid of intersecting bars printed on the matt diffusing surface thereof and covering such an area of said third side as to reduce the light output therethrough to about 25 percent of that through said fourth side.

3,878,386

LIGHTED BEVERAGE GLASS

David Douglas, 1119 Lincoln Blvd., Manitowoc, Wis. 54220

Continuation of Ser. No. 191,427, Oct. 21, 1971, abandoned.
This application July 11, 1973, Ser. No. 378,221
Int. Cl. F21l 15/00; F21v 33/00
U.S. Cl. 240—6.4 G 2 Claims



1. A lighted beverage glass comprising:

a stem means having a base portion and a stem portion fastened to the base portion, said stem means having a central bore extending therethrough, said stem portion having a cup-shaped glass mounting portion at the upper end thereof, said cup-shaped glass mounting portion including a planar bottom wall, an upstanding, annular side wall made of a flexible material and extending substantially perpendicularly from said bottom wall, and a plurality of gripping ribs projecting laterally inwardly from the inner face of said side wall closely adjacent the top edge thereof, said ribs adapted to make tight contact with the outer surface of a glass adjacent the bottom thereof and thereby securely retain the glass in said cup-shaped glass mounting portion;

a glass removably mounted in said cup-shaped glass mounting portion;

a light assembly mounted in said central bore of said stem means for directing light through the bottom of said glass, said light assembly including an electric incandescent bulb, a dry cell battery, a spring mounted between said bulb and said battery, and means for selectively establishing electrical contact between said bulb and said battery to thereby establish an electrical current path for energizing said bulb; and

an annular shoulder formed in said stem means at the top portion of said central bore to serve as a seat for said bulb with the top portion of said bulb projecting slightly past said shoulder, said spring biasing said bulb against said seat to thereby reduce the possibility of bulb breakage.

3,878,387

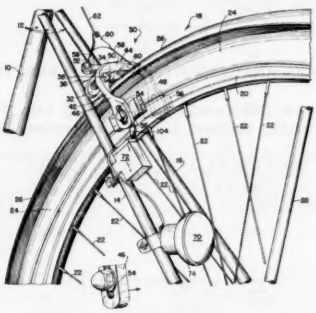
BICYCLE SIGNAL SYSTEM

Zarko Kovacic, Chicago, Ill., assignor to U.S. Bike-Lite, Inc., Chicago, Ill.

Filed June 24, 1974, Ser. No. 482,351
Int. Cl. B62j 5/00; H01h 3/16
U.S. Cl. 240—7.55 3 Claims

1. In a bicycle having a metal frame including a wheel-supporting fork provided with fork members which straddle and serve to rotatably support one of the bicycle wheels, a caliper brake assembly effectively mounted on said fork and including a pair of brake levers electrically connected to and pivotally mounted for swinging movement on said fork and having respective lever arms provided with brake shoes

thereon, said lever arms being movable toward and away from each other simultaneously in unison between normally retracted positions of brake release wherein said shoes are out of frictional contact with said rim region, and advanced positions of brake applicaton wherein such shoes frictionally engage the opposite sides of said rim region, and means for actuating said caliper brake assembly, the improvement which comprises a two-component stop light signalling system for the bicycle and embodying a signal lamp component and a battery pack component, said signal lamp component including a casing mounted on and electrically connected to said frame and having an electrical binding post terminal, said battery pack component including a casing fixedly mounted



on one of said fork members in the vicinity of said caliper brake assembly and provided with an electrical binding post terminal and a contact terminal, a flexible conductor extending between said binding post terminals, and a flexible contact strip having its proximate end mounted on said contact terminal and having its distal end region projecting into the space which exists between the adjacent lever arm and the rim region of the bicycle wheel, said distal end region being disposed directly in the path of movement of said latter lever arm and designed for electrical contact therewith upon application of the caliper brake assembly whereby an electrical circuit is established from the bicycle frame, through the signal lamp component, flexible conductor, battery pack, flexible contact strip, the adjacent lever arm and back to the frame.

3,878,388

LAMP ASSEMBLIES

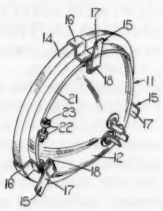
Michael John, Germany, Lichfield, England, assignor to Joseph Lucas (Industries) Limited, Birmingham, England

Filed July 27, 1972, Ser. No. 275,897

Claims priority, application United Kingdom, July 30, 1971, 35863/71

Int. Cl. F21v *17/02*

U.S. Cl. 240—41.5 **4 Claims**



1. A lamp assembly for a vehicle, including a lamp unit comprising a lens and a reflector interconnected at their peripheries, and a plurality of brackets secured to the lamp unit around its periphery, each bracket having a hook portion which engages the periphery of the lamp unit, a blade portion which extends from the lamp unit and a foot portion intermediate its blade portion and its hook portion, the assembly further including a retaining ring which engages each of the brackets intermediate its hook portion and its foot portion, the retaining ring clamping each bracket to the lamp unit with its hook portion engaged with the periphery of the lamp unit and its foot portion engaged with the reflector of the lamp unit.

3,878,389

TWIN ILLUMINATION TYPE HEADLIGHT

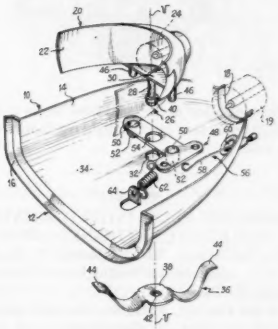
Olivier Puyplat, Paris, France, assignor to Cibie Projecteurs, Bobigny, France

Filed Mar. 27, 1974, Ser. No. 455,478

Claims priority, application France, Apr. 11, 1973, 73.13060

Int. Cl. F21r *13/04*

U.S. Cl. 240—41.35 A **6 Claims**



1. A motor vehicle headlight comprising:

a main reflector having a horizontal web portion with an aperture therein, a first light source within said main reflector,

a secondary reflector positioned within said main reflector, a second light source within said secondary reflector,

a vertically extending rod projecting from the secondary reflector and passing through the aperture in the web portion of the main reflector, the rod defining a substantially vertical pivot axis about which the secondary reflector is pivotable with respect to the main reflector,

resilient retaining means engaging the rod for resiliently biasing the secondary reflector, in the direction of the pivot axis, into engagement with the web portion of the main reflector,

a transmission mechanism connected to the secondary reflector for transmitting movements from a remote source to the secondary reflector to pivot the latter about the pivot axis; and

a link of adjustable length between the main and secondary reflectors for adjusting the inclination of the secondary reflector, about a horizontal axis, with respect to the web portion of the main reflector.

3,878,390

LAMP ADAPTER

Abe Hyman Feder, 15 W. 38th St., New York, N.Y. 10018

Filed July 3, 1974, Ser. No. 485,646

Int. Cl. F21v *17/00*

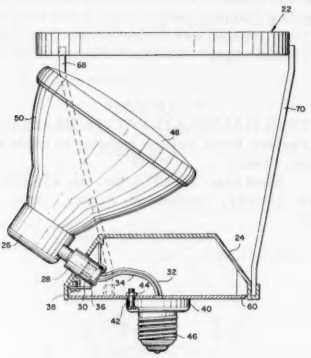
U.S. Cl. 240—153 **14 Claims**

1. A lamp adapter comprising:

A. A base including at least one base socket for support of an electric bulb fixture, together with an electrical connection extending from said socket;

B. An exterior male plug contacting said electrical connector and extending from said base so as to be engageable with an electric lamp socket;

C. At least one electrical lighting fixture supported in said base socket; and



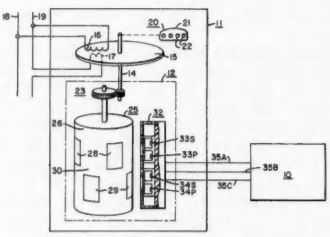
D. A baffle supported above said base, so as to direct selectively light from said electric lighting fixture with respect to said base.

3,878,391

RADIOMETRIC PULSE INITIATOR HAVING A REFLECTIVE PATTERNED DRUM

Theodore M. McClelland, III. and Joseph M. Keever, both of Raleigh, N.C., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 17, 1973, Ser. No. 425,669
Int. Cl. G01d *5/36*
U.S. Cl. 250—233 **8 Claims**



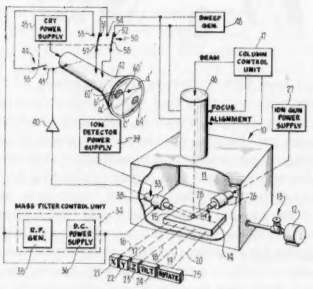
1. Apparatus for producing pulses in a three wire remote meter reading telemetry system, comprising: an integrating meter including a frame and an electroresponsive movement carried by the frame and having an electromagnetically driven rotatable member, said member being rotated at a predetermined rate such that each rotation represents a fixed value of an electrical quantity measured by the meter; and a pulse initiator including a support assembly detachably mounted to said frame of the meter, a gear train system carried in said support assembly including input gear means and an output gear means wherein the output gear means has a predetermined gear ratio relative to the input gear means, said input gear means being rotatably coupled to said rotatable member, a drum assembly rotatably mounted on said support assembly for rotation by said output gear means, said drum assembly including a cylindrical side surface covered by a non-reflecting coating and having two staggered rows of a fixed preselectable number of convex cylindrical reflecting segments substantially equally circumferentially spaced by the non-reflecting coating, and sensing means including first and second radiation responsive source-pickup pairs mounted in said support assembly immediately adjacent said cylindrical side surface in optical register with said first and second rows of the reflecting segments, respectively, each of said pickups of the first and second pairs being alternately activated in response to alternately reflected optical coupling paths between the pickup and the associated source of each pair upon rotation of said drum assembly by the rotatable member such that the alternately activated pickups are effective to initiate pulses corresponding to predetermined quantized amounts of the measured electrical quantity as established by the predetermined rate of said meter, the predetermined gear ratio of said gear train system, and the preselected number of reflecting segments.

3,878,392

SPECIMEN ANALYSIS WITH ION AND ELECTROM BEAMS

Nelson C. Yew, Hillsborough, and Wyman C. Lane, Fremont, both of Calif., assignors to Etec Corporation, Hayward, Calif.

Filed Dec. 17, 1973, Ser. No. 425,457
Int. Cl. G01n *21/26, 23/12*
U.S. Cl. 250—306 **12 Claims**



1. A method of analyzing a specimen for elemental constituents comprising the steps of:

a. directing a beam of primary ions to a target area of said specimen to produce secondary ions;

b. scanning said irradiated target area with an electron beam; and

c. detecting the variation of secondary ion current with position of said electron beam.

3,878,393

SELECTIVE EMITTER OFFSET RADIATION SOURCE FOR COMPENSATING RADIATION DETECTORS FOR SELECTIVE RADIATION EMITTED THEREFROM

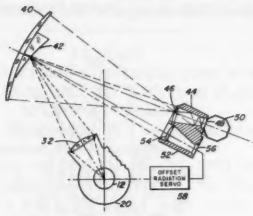
Allen W. Bartlett, Stratford, Conn., assignor to Barnes Engineering Company, Stamford, Conn.

Filed Dec. 5, 1973, Ser. No. 422,116
Int. Cl. G01t *1/16*
U.S. Cl. 250—349 **8 Claims**

1. In an infrared sensor having a plurality of infrared detector means of the type which produce a zero output signal when radiation into the detector means equals radiation emitted from the detector means, and optical means for selectively imaging infrared radiation of predetermined wavelengths onto the detector means, the improvement which comprises

a. a spherical selective emitter offset radiation heat source for emitting radiation of predetermined wavelength, enclosed in a reflective spherical housing,

b. means for applying radiation from said spherical selective emitter offset radiation heat source to said detector means, and



c. means actuated by an output signal from said detector means acting as a reference for varying the temperature of said selective emitter offset radiation source until the selective radiation therefrom applied to said detector means equals the radiation emitted by said detector means.

3,878,394

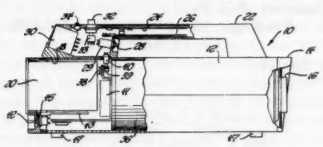
PORTABLE X-RAY DEVICE

John P. Golden, 5740 Warren Rd., Ann Arbor, Mich. 48105

Filed July 9, 1973, Ser. No. 377,741

Int. Cl. H01j *35/00*

U.S. Cl. 250—402 **12 Claims**



1. An X-ray source device comprising: a voltage generator including a wrapped foil spiral capacitor of cylindrical configuration; a transformer unit including cylindrical windings; the capacitor and transformer unit being coaxially disposed in axially spaced relation; a sealed cylindrical metallic canister containing both the capacitor and transformer unit and being electrically connected to each; an X-ray tube disposed coaxially with the capacitor and transformer unit, and trigger means electrically connecting the tube to said capacitor to received voltage pulses therefrom.

3,878,395

METHOD AND MEANS FOR OPERATING X-RAY TUBES WITH ROTARY ANODES

Gerd Seifert, and Gunther Appelt, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

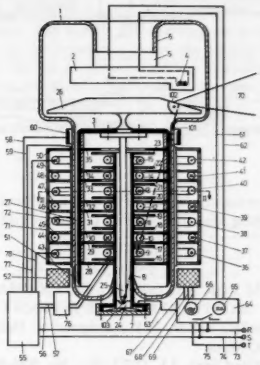
Filed Dec. 11, 1973, Ser. No. 423,665

Claims priority, application Germany, Dec. 21, 1972, 2262757

Int. Cl. G03b *41/16*

U.S. Cl. 250—402 **15 Claims**

1. A process for operating rotary anodes of X-ray tubes, comprising magnetically supporting the anode free from contact except for a support transmitting the X-ray current and rotating the anode continuously during the entire period in which there is a possibility that an X-ray photograph will be taken.



3,878,396

COMPOSITION EMITTING INFRA-RED RADIATION

Andre Vallet, Bordeaux, France, assignor to Societe Europeenne de Propulsion Societe Anonyme dite, Puteaux, France

Filed Sept. 26, 1973, Ser. No. 400,981

Claims priority, application France, Oct. 27, 1972, 72.38245

Int. Cl. H01j *35/00*

U.S. Cl. 250—493 **10 Claims**

1. A composition for emitting infra-red radiation in the presence of water comprising:

a. a first reactive entity comprising at least two chemical compounds which react with each other exothermically in the presence of water;

b. a second reactive entity comprising at least one chemical compound which reacts with water to release ammonia;

c. the heat generated by the first and second reactive entities when combined with water being sufficient to raise the temperature of the said released ammonia to a temperature at which it emits infra-red radiation.

3,878,397

ELECTRO-OPTICAL TRANSMISSION LINE

Ian E. Robb, Newport Beach, Calif., and John S. Clanton, Alexandria, Va., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed June 29, 1973, Ser. No. 375,159The portion of the term of this patent subsequent to May 7, 1991, has been disclaimed.

Int. Cl. G02b *5/14*; **H01j** *5/16*

U.S. Cl. 250—551 **3 Claims**

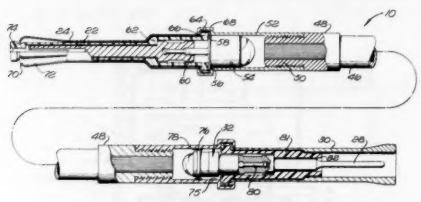
1. In an electro-optical transmission line:

at least one optical fiber;

a coaxial electrical contact assembly at an end of said fiber; said contact assembly including a shell and a pair of inner and outer contacts extending outwardly from one end of said shell, said outer contact surrounding said inner contact;

an optoelectronic device in said shell directed toward said

end of said fiber, said device being electrically connected to said inner and outer contacts; and



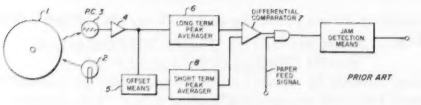
coupling means on said end of said fiber readily removably connecting said fiber end to the other end of said shell.

3,878,398

SYSTEM FOR DETECTING GIVEN CHANGES IN MONITORED LIGHT INTENSITY

David C. Nellis, Victor, N.Y., assignor to Itek Corporation, Lexington, Mass.

Filed Sept. 13, 1973, Ser. No. 396,919
Int. Cl. G01n *21/32*
U.S. Cl. 250—561 **10 Claims**



1. A system for detecting given changes in perceived light intensity comprising:

a. monitoring means for producing a signal proportional to perceived light intensity;

b. peak memory means coupled to the output circuit of said monitoring means for storing a signal indicative of the highest intensity light signal monitored by said monitoring means;

c. integrating means coupled to the output circuit of said peak memory means for storing a signal indicative of the highest intensity light signal monitored by said monitoring means after a period of time longer than that required by said peak memory means; and

d. signal generating means for producing an output signal upon the occurrence of a given difference between the signal produced by said peak memory means and the signal stored in said integrating means due to a predetermined change in light intensity monitored by said monitoring means.

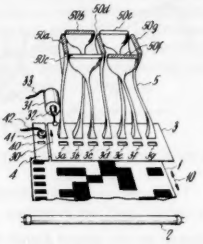
3,878,399

OPTICAL CHARACTER DISPLAY DEVICE

Hiroshi Higuchi, Akashi; Hiroshi Fujita, Kakogawa, and Yasutoshi Masuda, Ashiya, all of Japan, assignors to Yamato Scale Company, Limited, Akashi-shi, Hyogo-ken, Japan

Filed Sept. 19, 1973, Ser. No. 398,700
Claims priority, application Japan, Oct. 3, 1972, 47-9945; Feb. 20, 1973, 48-20491; Dec. 28, 1972, 48-2466
Int. Cl. G08c *9/06*
U.S. Cl. 250—570 **6 Claims**

4. An optical character display device, comprising a code plate carrying coded patterns of predetermined characters to be displayed, said patterns being composed of a predetermined number of tansparent and opaque sections arranged side by side at a constant pitch, a light source for illuminating said code plate from one side thereof, a plurality of display segments corresponding to the number of said transparent or opaque sections each of said display segments having a light inlet end facing each of said transparent and opaque sections, a light outlet end arranged to form a part of said predetermined characters and an elongated light guide communicating both of said ends, said code plate further carrying a correction code pattern consisting of repeated alternation of transparent and opaque sections arranged at said constant pitch, and said



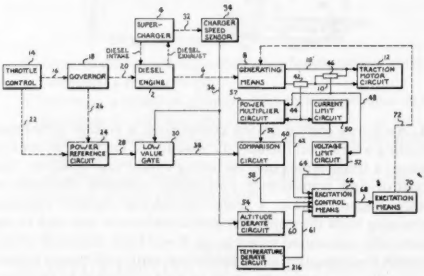
device further comprises a photoelectric converting element located in facing relationship to said correction code pattern of said code plate to be illuminated through said pattern by said light source, said photoelectric element being provided with a slit located between said element and said code plate, and means for adjusting the facing positions of the light inlet ends of said display segments and said code plate are relative to the other by a predetermined distance in response to the detected output of said photoelectric element.

3,878,400

EXCITATION CONTROL ARRANGEMENT FOR DIESEL-LECTRIC PROPULSION SYSTEMS

Lloyd Wilfred McSparran, Erie, Pa., assignor to General Electric Company, Erie, Pa.

Filed Apr. 30, 1973, Ser. No. 355,800
Int. Cl. B60l *11/02*
U.S. Cl. 290—14 **7 Claims**



1. In a diesel engine propulsion system for traction vehicle wherein a supercharged diesel engine drives rotating electrical generating means providing an electrical output to traction motors and the rotor of a centifugal turbocharger is driven by diesel exhaust gases to provide pressurized air to the diesel engine, the combination comprising:

a. first reference means for generating a power reference signal indicative of the preselected power output of said generating means;

b. turbo signal means for producing a rotor speed signal varying as a function of turbo supercharger rotor speed;

c. gating means connected to said reference means and turbo signal means to provide a gate output signal representative of the smaller one of said power reference and rotor speed signals;

d. power signal means to produce a power output signal varying as a function of the actual power output of said generating means;

e. summing means connected to algebraically combined said power output and gate output signals to produce a load control signal, and

f. load control means for applying said load control signals to modify the power output of said generating means.

3,878,401

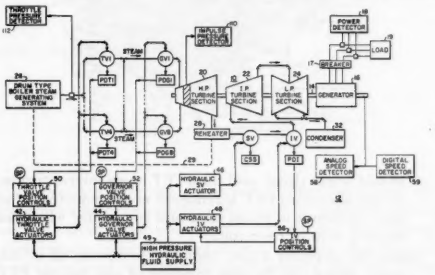
SYSTEM AND METHOD FOR OPERATING A TURBINE-OWERED ELECTRICAL GENERATING PLANT IN A SEQUENTIAL MODE

Uri G. Ronnen, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 306,979, Nov. 15, 1972, abandoned. This application June 10, 1974, Ser. No. 478,815

Int. Cl. G06j *1/00*; **G06f** *15/06, 15/56*

U.S. Cl. 290—40 **19 Claims**



1. A system for operating a turbine power plant during a mode wherein a plurality of steam inlet valve means are operable successively in a predetermined sequence to effect variations in steam flow to the turbine comprising a steam turbine, a plurality of steam inlet valve means, each of which includes at least one steam inlet valve, control means for each valve means governed by a generated representation of valve lift position demand, means to generate a physical representation of total steam flow demand for the turbine, means to allocate successively portions of the total steam flow demand representation to respective ones of the plurality of valve means in the predetermined sequence so that allocated flows substantially equal the total steam flow demand, means governed by the total steam flow demand representation and the allocating means to generate for each valve means a representation of an allocated valve steam flow demand, said valve steam flow demand generating means being operative to govern the valve steam flow representations to correspond to a portion of the maximum flow capacity for sequentially operable valve means at times when the total turbine steam flow demand yet to be allocated is between predetermined flow values, and means governed by the generated allocated valve steam flow representations to generate respective valve lift position representations for the valve control means.

3,878,402

APPARATUS FOR DETECTING RAPID VARIATIONS IN AN OUTPUT QUANTITY

Thomas Ernest Edwin Roberts, Birmingham, and John Norman Barnard, Solihull, both of England, assignors to Lucas Aerospace Limited, Birmingham, England

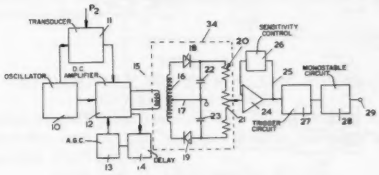
Filed Mar. 12, 1973, Ser. No. 340,234

Claims priority, application United Kingdom, Mar. 16, 1972, 12307/72

Int. Cl. H03k *5/20, 17/74*

U.S. Cl. 307—235 **6 Claims**

1. An apparatus for detecting a rapid variation in an input quantity, comprising means for generating an alternating signal having a frequency which is substantially constant and having an amplitude dependent on the magnitude of the input quantity, first and second similar diodes, said alternating signal being applied to a respective anode and cathode of said first and second diodes, a resistance chain between the cathode of the first diode and the anode of the second diode, a pair of dissimilar capacitors connected in series across the resistance chain and having their common point connected to a reference voltage and means for deriving an output from a selected point on the resistance chain, the arrangement being such that the discharge time of either capacitor is much greater than the length of a half cycle of the said alternating



signal, said alternating signal generating means including a transducer device responsive to said input quantity to provide a first electrical signal and an amplifier responsive to said first electrical signal, said amplifier having an automatic gain control device so that said alternating signal has a maximum value when said first electrical signal exceeds a predetermined level, and a delay circuit to which said gain control device is responsive, the arrangement being such that said gain control device operates to maintain said alternating signal substantially at said maximum value except when a fall in said first electrical signal is such as to cause a substantial reduction in said alternating signal from said maximum value in a time less than the delay imposed by said delay circuit.

3,878,403

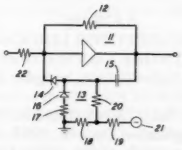
LIMIT CIRCUITS

Charles C. Willhite, Las Cruces, N. Mex., and George E. Zenk, Dover, N.J., assignors to Bell Telephone Laboratories, Incorporated, New York, N.Y.

Filed July 23, 1959, Ser. No. 829,145

Int. Cl. H03k *5/08*

U.S. Cl. 307—237 **5 Claims**

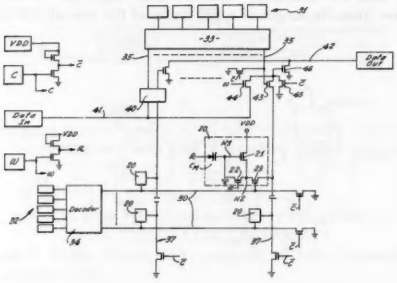


1. A limit circuit comprising an operational amplifier, means coupled to the output of said amplifier for providing a voltage which is a derivative of the output voltage of said amplifier, a diode connected to the input of said amplifier, means coupling a predetermined bias voltage to said diode to maintain the same in a normally nonconductive state, and means coupling said derivative voltage to said diode to place it in a conductive state to thereby deliver a feedback current to the amplifier input whenever said derivative voltage exceeds said bias voltage.

3,878,404
INTEGRATED CIRCUIT OF THE MOS VARIETY

Terry R. Walther, Sunnyvale, and Michael R. McCoy, San Jose, both of Calif., assignors to Electronic Arrays, Inc., Mountain View, Calif.

Filed Oct. 30, 1972, Ser. No. 302,199
Int. Cl. H01l *11/14*
U.S. Cl. 307—238 **4 Claims**



1. In an integrated circuit of the variety, wherein the active elements include field effect transistors, which includes first signal means for providing read control signals and second signals means for receiving signals, and which also includes means providing a driving voltage, independently from the said read control signals, the combination comprising:

means for establishing first and second nodes;

a first field effect transistor having its main electrodes respectively connected to the first and second nodes, and having a gate for receiving a write-control signal;

a second field effect transistor having its main electrodes connected directly to the first node and to the means providing driving voltage to derive therefrom driving voltage independently from the read and write control signals, the second transistor having its gate connected to as being part of the second node;

a voltage gated capacitor structurally integral with said transistor and having its gate connected to the second node and its single main electrode connected to the first signal means to receive therefrom a read control signal; and

field effect means connected to be responsive to addressing signals for transferring signals between the second node and the second signal means outside of the combination.

3,878,405
SWITCHING CIRCUITRY FOR LOGICAL TESTING OF NETWORK CONNECTIONS

Tage Peter Sylvan, Milton, Mass., assignor to Teradyne, Inc., Boston, Mass.

Division of Ser. No. 271,269, July 13, 1972, Pat. No. 3,795,860. This application Dec. 10, 1973, Ser. No. 423,274
Int. Cl. G01r *31/02*; H03k *19/08*; G01r *15/12*
U.S. Cl. 307—247 R **2 Claims**

2. A wiring test system for testing a matrix of connection points interconnected in an arbitrary plurality of networks, said system comprising a multiplicity of switching units, one for each of said points, each unit comprising:

a first FET of one conductivity type connecting said point to a first bus;

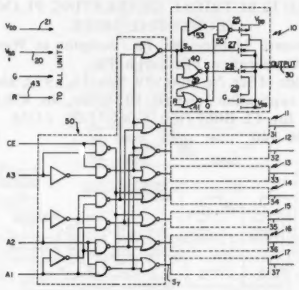
second and third FETs of said first conductivity type, said second and third FETs being connected in series with each other, with the series pair thereby formed being in parallel with said first FET;

a FET of conductivity type complementary to said first type connecting said point to a second bus;

a flip-flop having a set state and a reset state;

means for applying to said first FET a respective select signal provided to the unit for rendering said first FET conductive, said select signal being applied also to said flip-flop for placing it in its set state;

gate means responsive to said select signal and interconnecting said flip-flop and said complementary type FET for permitting said complementary type FET for permitting said complementary type FET to be rendered conductive by said flip-flop in the set state after termination



of said select signal, said third FET being interconnected so that said third FET is rendered non-conductive when said flip-flop is in its set state and conductive when said flip-flop is in its reset state;

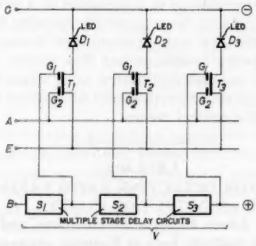
means for applying a gate signal, common to all of said units, directly to the gate terminal of said second FET, whereby conduction between said point and said first bus can be developed progressively by a gradually changing gate signal when said flip-flop is in its reset state; and

means for applying a reset signal, common to all of said units, to said flip-flop for placing it in its reset state.

3,878,406
CIRCUIT ARRANGEMENT FOR DRIVING LIGHT EMITTING SEMICONDUCTOR COMPONENTS

Heinz Beneking, Aachen, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed July 17, 1973, Ser. No. 379,980
Claims priority, application Germany, July 21, 1972, 2235866
Int. Cl. H03k *3/26*
U.S. Cl. 307—304 **12 Claims**



1. A circuit arrangement for driving light emitting semiconductor components, comprising a light emitting component connected in series with the controllable current path of a field effect transistor tetrode, a voltage being fed to one control electrode of the tetrode for driving that part of the tetrode which is in the region of this control electrode and a voltage corresponding to the desired luminous intensity of the light

emitting component being applied to the other control electrode.

3,878,407

SURFACE WAVE ELECTROMECHANICAL FILTER

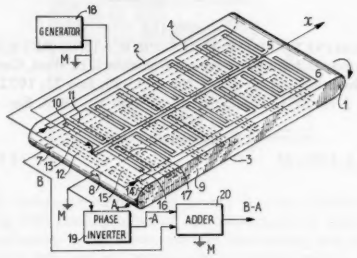
Pierre Hartemann, and Francel Genauzeau, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Dec. 18, 1973, Ser. No. 425,792

Claims priority, application France, Dec. 22, 1972, 72.45840

Int. Cl. H01v *7/00*

U.S. Cl. 310—8.1 **10 Claims**



1. A surface wave electromechanical filter having two terminal pairs and comprising: a piezoelectric substrate having two main faces facing one another, first and second interdigitated transducer means arranged on one of said main faces for forming a pair of collateral radiator elements, third and fourth interdigitated transducer means arranged on the other one of said main faces for forming a pair of further collateral radiator elements, at least one curved face linking with one another said main faces, first electrical connecting means for parallel connection of said collateral radiator elements with one of said terminal pairs, and balanced-unbalanced electrical connecting means for connecting the other of said terminal pairs to the respective terminals of said further collateral radiator elements.

3,878,408

QUARTZ CRYSTAL TIMEPIECE HAVING TUNING CAPACITOR DEVICE

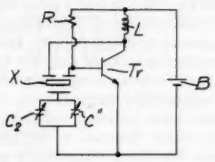
Isao Nemoto, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Apr. 6, 1973, Ser. No. 348,574

Claims priority, application Japan, Apr. 6, 1972, 47-33839; May 2, 1972, 47-44026

Int. Cl. H01v *7/00*

U.S. Cl. 310—8.1 **3 Claims**



1. In a circuit particularly suited for producing oscillating signals and including a parallel coupled continuous variable capacitor and a step variable capacitor, the improvement comprising said step variable capacitor, and continuously variable capacitor being mounted to a base plate, first and second lower electrodes mounted on said base plate, and means mounted on said base plate electrically connecting said lower electrodes, said step variable capacitor being defined by a fixed dielectric mounted on said first lower electrode, and a plurality of upper electrodes mounted on said fixed dielectric, each of said electrodes having a different area overlapping said lower electrodes, a rotatable electrically conductive first switch contact member selectively positionable in electrical engagement with one of said upper electrodes, and said continuously variable capacitor being defined by an electrically conductive shaft rotatably mounted on said base plate out of electrical engagement with said first and second lower electrodes; a rotatable dielectric mounted for rotation with said shaft partly overlapping said second lower electrodes; a rotatable upper electrode supported by said rotatable dielectric in variable overlapping relation to said second lower electrode and electrically connected to shaft; said switch contact being supported by and electrically connected to said electrically conductive shaft.

3,878,409

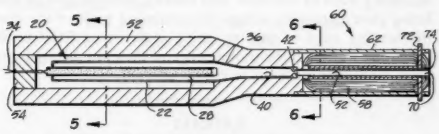
EXPLOSIVELY DRIVEN ELECTRIC POWER GENERATION SYSTEM

Stephen Paschall Gill, Atherton, and Dennis Willard Baum, Berkeley, both of Calif., assignors to Artec Associates Incorporated, Hayward, Calif.

Filed June 21, 1973, Ser. No. 372,336

Int. Cl. H02n *4/00*

U.S. Cl. 310—11 **28 Claims**



1. A method of producing a flow of an electrically conductive driver working gas of the kind required for a magnetohydrodynamic electric generator, said method comprising, positioning an elongated core of an explosive inside a container, spacing one surface of the elongated core of explosive a selected distance from a related inside surface of the container, filling the space between the core and the inside surface with a working gas to be made electrically conductive, igniting the elongated core of explosive at one end edge and progressively detonating the explosive along the length of the core to the other end edge while simultaneously progressively compressing the working gas against said related inside surface of the container in the direction of detonation to an electrically conductive state and forcing the compressed gas in a flow stream along the container surface in the direction of detonation by the outward expansion of the explosive to thereby concentrate explosive energy in an intermediary driver gas having very high values of temperature and electrical conductivity.

3,878,410

TWO-PHASE LIQUID-METAL MAGNETOHYDRODYNAMIC (MHD) GENERATOR

Michael Petrick, Joliet; John C. Cutting, Downers Grove; William E. Amend, Hinsdale, and Roger L. Cole, Riverside, all of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

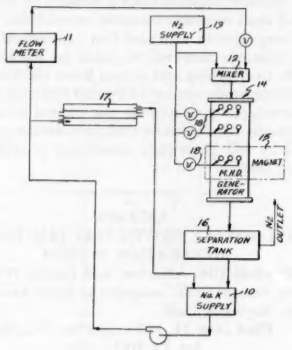
Filed Feb. 21, 1974, Ser. No. 444,601

Int. Cl. H02k *45/00*

U.S. Cl. 310—11 **6 Claims**

1. A two-phase liquid-metal magnetohydrodynamic generator comprising a duct consisting of opposing metal electrode walls, opposing metal side walls and insulating walls covering the interior of the side walls, means for admitting a working fluid consisting of a two-phase mixture of an inert gas and a liquid metal to one end of the duct, means establishing a magnetic field through said duct, means for collecting the

electric current generated by passage of the working fluid through the duct, and means for establishing a thin film of gas on the insulating walls of the duct to displace the slow-moving boundary layer of working fluid including a plurality of nozzles which inject gas into the duct in the direction of flow of



the working fluid in a narrow slit or slits extending across the insulating walls of the duct, said nozzles consisting of an insulating plate extending across the insulating walls of the duct, the leading edge of the insulating plate being fixed to the insulating walls and the trailing edge of the plate being spaced from the insulating walls to create said slit.

3,878,411

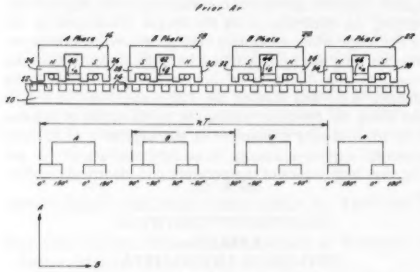
COMPENSATING POSITIONING SYSTEM

Bernabe Nocito, Canoga Park, and Clifford R. Frohmberg, Woodland Hills, both of Calif., assignors to Xynetics, Inc., Canoga Park, Calif.

Continuation of Ser. No. 264,718, June 21, 1972, abandoned. This application Feb. 1, 1974, Ser. No. 438,701

Int. Cl. H02k *41/02*

U.S. Cl. 310—12 **28 Claims**



1. A positioning system for providing a controlled relative movement between two members along at least a first axis, including:

a first member forming a platen having at least a first area having a first energy configuration, and

a second member disposed relative to the first member for independent movement relative to the first member along the first axis and with the second member including first means cooperative with the first area in a first phase relationship and energizable in a first phase relationship for producing a force between the second member and the first area of the first member to provide a displacement of the second member relative to the first member along the first axis and with the second member including second means cooperative with the first area in a second phase relationship different from the first phase relationship and energizable in the second phase relationship for producing a force between the second member and the first area of the first member to provide a displacement of the second member relative to the first member along the first axis and with the displacement provided by the force from the second means compensating for nonlinearities in the displacement provided by the force from the first means, each of the first and second means including a pair of means having a phase displacement different from the displacement between the first and second phase relationships and energizable in phases differing by such phase displacement.

3,878,412

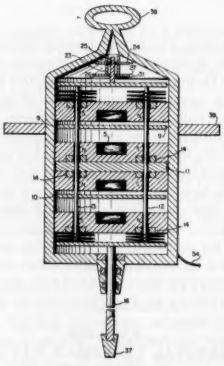
MAGNETO-MOTIVE RECIPROCATING DEVICE

Waldemar Helmut Kurpanek, 4 Dusseldorf, 11 West, Germany

Continuation-in-part of Ser. No. 273,940, July 23, 1972, Pat. No. 3,768,051. This application Sept. 19, 1973, Ser. No. 398,820

Int. Cl. H02k *33/16*

U.S. Cl. 310—24 **13 Claims**



1. A magneto-motive reciprocating device having a reciprocating chamber and comprising:

at least two permanent magnets rigidly mounted within said chamber so that both the poles of one magnet face both the poles of the other across a given distance and gap to form an enclosed space therebetween, said facing poles being of opposite magnetic polarity, said oppositely poles magnets producing a closed ring flux field;

generating means for generating an electromagnetic field in direction substantially perpendicular to the gap within said enclosed space between said two magnets;

reciprocating means disposed in the gap within said enclosed space and being magnetically polarizable by the applied field of said generating means;

field reversing means operatively associated with said reciprocating means and said generating means for continuously reversing the field of said generating means and hence the magnetic polarization of said reciprocating means whereby said reciprocating means is alternately attracted towards an appropriate respective one of said magnets and repelled away from the other so as to reciprocably move theretween.

3,878,413
TURBO-GENERATOR, THE ROTOR OF WHICH HAS A DIRECT LIQUID-COOLED WINDING

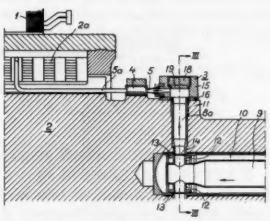
Kristian Dahl Madsen, Vasteras, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed Feb. 5, 1974, Ser. No. 439,947

Claims priority, application Sweden, Feb. 23, 1973, 7302556

Int. Cl. H02k *9/00*

U.S. Cl. 310—59 **1 Claim**



1. A turbo-generator rotor having a direct liquid-cooled winding with cooling tubes of corrosion-resistant material in the conductor, a corrosion-resistant distributing ring divided internally into sectors, electrically insulating spacing pieces connecting the cooling tubes to the sectors, said sectors including inlet and outlet sectors, the rotor having a shaft and inner and outer tubes of corrosion-resistant material extending axially within the shaft, first and second radial tube arranged in the rotor shaft, the first radial tube being connected to the inner axial tube and the second radial tube being connected to the outer axial tube, said radial tubes and said axial tubes being arranged substantially without radial play in the rotor shaft, the radial tubes being of equal length, the distributing chamber having an inner wall, the radial tubes being connected at their outer ends in said inner wall, the inner axial tube being sealed at its inner end and having at least one radially extending nozzle connected to one of said axial tubes, said nozzle having a surface part at its free end which engages and seals against a corresponding surface part of the inside wall of the outer axial tube, the other radial tube being connected to the outer axial tube, the outer wall of the distributing ring being provided with a plurality of openings and screw covers mounted therein, said openings being located in radial alignment with the radial tubes and being concentric with the longitudinal axis of the tubes.

3,878,414
ELECTRIC MOTOR ARRANGEMENT

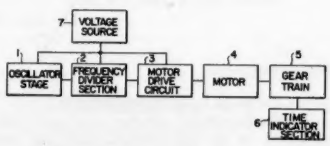
Mototaka Harakawa, Shizuoka, Japan, assignor to Star Seimitsu Kabushiki Kaisha (Star Mfg. Co., Ltd.), Shizuoka-ski, Shizuoka-ken, Japan

Filed Nov. 21, 1973, Ser. No. 418,040

Claims priority, application Japan, Nov. 22, 1972, 47-117473; Nov. 30, 1972, 47-120190

Int. Cl. H02k *21/12*

U.S. Cl. 310—156 **3 Claims**



1. An electric motor arrangement comprising:

a rotor being formed as a single rotatable disc made of soft magnetic material, said disc having a plurality of radially projecting rotor poles disposed equi-distantly on its periphery,

each of said rotor poles having a turned-up axial projection;

a concentric disc-shaped permanent magnet being mounted fixedly to the lower surface of said disc;

a rotor shaft, said disc and said permanent magnet being mounted fixedly on said rotor shaft;

a stator plate consisting of a pair of parallel arms which form stator elements and are disposed in a 180° — offset manner, said arms having a plurality of diametrically opposite stator poles disposed concentrically to the disc, said stator poles being disposed across a pre-determined air gap from said rotor poles and arranged at equal pitches with said rotor poles; and

an energizing coil being wound on one of said arms of said stator plate, said permanent magnet magnetizing said rotor poles to a pre-determined magnetic polarity and said stator poles to the opposite magnetic polarity thereby preventing the fluxes flowing through said rotor poles and said stator poles from causing axial forces in said rotor shaft and thus providing a large torque to said rotor shaft at a small input power.

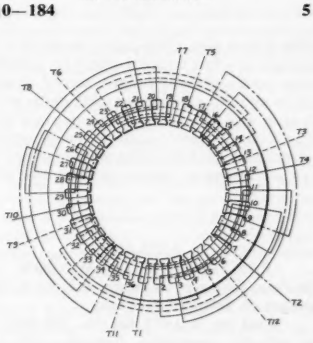
3,878,415
WINDING FOR ROTARY ELECTRICAL DEVICE AND METHOD OF MAKING

Adolph J. Wesolowski, Dayton, Ohio, assignor to Dyna Corporation, Dayton, Ohio

Filed July 19, 1973, Ser. No. 380,660

Int. Cl. H02k *3/00*

U.S. Cl. 310—184 **5 Claims**



1. A polyphase winding for rotary electrical apparatus having a soft iron member with axial slots distributed circumferentially about said member; said winding comprising a plurality of coil means with coil sides in said slots and coil ends extending between said coil sides, each coil means having terminals at the opposite ends, each coil means overlapping the coil means next adjacent thereto on each side, and each slot of said member having a single coil side only therein, the number of slots in the member being a whole number times the product of the number of magnetic poles of the apparatus and the number of phases.

3,878,416
INTEGRAL FLUORESCENT-INCANDESCENT LAMP STRUCTURE

William J. Roche, Merrimac, and Theodore Wroblewski, Danvers, both of Mass., assignors to GTE Sylvania Incorporated, Danvers, Mass.

Filed Dec. 5, 1973, Ser. No. 421,979

Int. Cl. H01j *61/00*

U.S. Cl. 313—3 **2 Claims**

1. A fluorescent-incandescent lamp structure comprising in combination, an elongated tubular glass envelope which is

hermetically sealed; a phosphor coating on the inside surface of said tubular envelope; mercury and a rare gas contained in said tubular envelope; first and second electrodes disposed within and at opposite ends of said tubular envelope; a base attached to one end of said tubular envelope; a threaded receptacle attached to the other end of said tubular envelope; an incandescent lamp removably attached to the receptacle end of said tubular envelope, said incandescent lamp including a threaded base which is screwed into said threaded receptacle; a first lead-in wire electrically connecting a first terminal of said base to a first terminal of said receptacle; a second lead-in wire electrically connecting a second terminal of said receptacle to said first electrode in said tubular envelope; and a third lead-in wire electrically connecting said second electrode in said tubular envelope to a second terminal of said base; said incandescent lamp being selected to provide ballasting for an arc discharge across said first and second electrodes.

3,878,417

RAY TRANSMITTING WINDOW

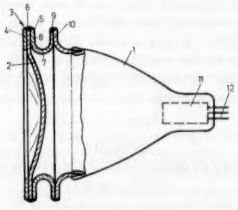
Dieter Eberlein, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Erlangen, Germany

Filed Oct. 4, 1972, Ser. No. 294,868

Claims priority, application Germany, Oct. 13, 1971, 2151079

Int. Cl. H01i *35/18*

U.S. Cl. 313—59 **2 Claims**



1. A ray transmitting window comprising a metal frame and a thin metal foil having an outer edge welded to the outer edge of the frame, said frame comprising a flange consisting of a profiled part of U-shaped cross-section and having two legs, one of said legs being attached to said foil.

3,878,418

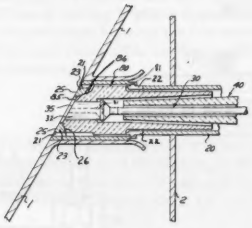
IGNITER PLUG

Helmut P. Meyer, Sidney, N.Y., assignor to The Bendix Corporation, Southfield, Mich.

Filed Jan. 28, 1974, Ser. No. 437,258

Int. Cl. H01t *13/20*

U.S. Cl. 313—118 **3 Claims**



1. In combination with a spark plug of the type having an inner elongated electrode having a front portion, a rear portion, and a central axis; a forward elongated insulator disposed around the forward portion of said electrode; an intermediate elongated insulator disposed around at least the rear portion of said electrode; an outer elongated metal shell disposed around the electrode and electrically isolated therefrom by the forward and intermediate insulators, said metal shell having a front end portion arranged to provide a spark gap with the end of the front portion of said electrode, the improvement wherein the front end of said spark plug terminates in an angled surface comprising:

the front portion of said inner elongated electrode which terminates in a first angled surface;

one end of the forward elongated insulator which terminates in an angled surface parallel to said first angled surface; and

the forward end of the front end portion of said metal shell which terminates in an angled surface parallel to said first angled surface.

3,878,419

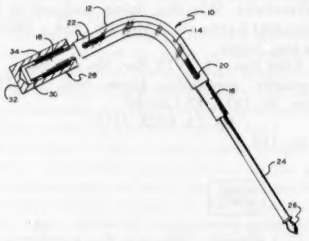
PRECISION BASE MERCURY VAPOR LAMP

Carlo F. Lafiandra, 278 Long Meadow Rd., Kinnelon, N.J. 07405

Filed Dec. 17, 1973, Ser. No. 425,384

Int. Cl. H01j *5/50*

U.S. Cl. 313—51 **7 Claims**



1. A gaseous discharge lamp, comprising:

a. a radiation-transmitting tubular envelope defining a plasma cavity of arcuate configuration and capillary cross-section containing an ionizable gaseous substance;

b. a rigid mounting base fixedly secured to one end of said envelope having a configuration which is geometrically unique with respect to a predetermined position and

spatial orientation of said envelope whereby installation of the lamp in its operating environment automatically and reproducibly places the envelope and, concomitantly, the plasma cavity of the lamp in a predetermined position and spatial orientation relative to said environment; and

c. means for coupling the lamp to a power source for applying an operating potential to said plasma cavity.

7. In combination, a gaseous discharge lamp according to claim **1** and a mounting fixture therefore comprising:

a. a mounting block having a configuration complementary to and adapted to receive said mounting base in a fixed position defined by its co-action with the configuration of said mounting base; and

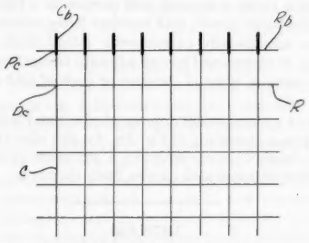
b. means releasably retaining said mounting base in said mounting block.

3,878,420

GAS DISCHARGE DEVICE HAVING WIDE ELECTRODE IN BORDER PILOT CELL

Michael E. Fein, and H. Joseph Hoehn, both of Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Sept. 7, 1972, Ser. No. 286,868
Int. Cl. H01j *17/04*
U.S. Cl. 313—217 **9 Claims**



1. In a multiple gas discharge display/memory panel comprising a matrix of display cells formed by intersecting electrodes, each cell having opposed dielectric members for the storage of charges, at least one cell in the border of the panel matrix being in the ON state for the conditioning of the matrix display cells,

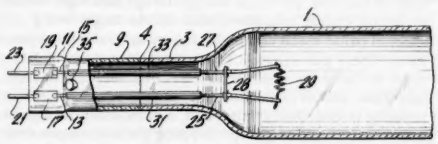
the improvement wherein each pilot cell is defined by the intersection of one electrode common to at least one matrix display cell and another electrode not common to any matrix display cell, the geometric width of the common electrode being greater in its pilot cell than in its display cells.

3,878,421

HIGH INTENSITY ULTRAVIOLET LAMP AND METHOD FOR PRODUCING THE SAME

Hilary Boehme, Fort Salonga, N.Y., assignor to Atlantic Ultraviolet Corporation, Long Island City, N.Y.

Filed Jan. 31, 1974, Ser. No. 438,473
Int. Cl. H01j *61/30, 61/06*
U.S. Cl. 313—220 **5 Claims**



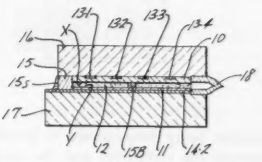
1. A high intensity ultraviolet lamp comprising a high silica content, tubular glass envelope having at each end a neck of reduced diameter compressed on the end to form a seal retaining a pair of leads connected on the interior of said envelope with an electrode filament, said filament being situated at about the entrance to the main body of said envelope, and an ionizable gas within said envelope capable of producing ultraviolet light upon electrical energization of said gas.

3,878,422

DISPLAY OF TIME-DEPENDENT VECTOR INFORMATION

Felix H. Brown, East Lansing, and Maclin S. Hall, Okemos, both of Mich., assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Nov. 17, 1971, Ser. No. 199,802
Int. Cl. H01j *7/30*
U.S. Cl. 313—220 **20 Claims**



20. A gaseous discharge display/memory device for displaying time-dependent vector information as color difference and comprising a multiplicity of gas discharge cells, an ionizable gaseous medium, means for addressing said gas discharge cells in sequence at varying rates to display a moving target and a plurality of phosphors excitable by radiation for discharge of said gaseous medium, the visual color output of said gaseous medium when discharged being different from that of the phosphors, and the luminescence rise or decay time of said phosphors being substantially longer than the rise or decay time of the radiation emission of the gas discharge, such that when discharge is initiated in sequence in a series of cells and simultaneously the earliest previously initiated cells are erased in sequence the most recently initiated cell of the series exhibits the color of the gas discharge, the most recently erased cell exhibits the color of the phosphors, and those cells which have been previously initiated and have been in the ON state for a period of time longer than the rise time of the phosphors exhibit a color which is the combination of the output of both the phosphors and the gas discharge.

3,878,423

ELECTRICAL SURGE ARRESTOR HAVING FAIL-SAFE PROPERTIES

John Hill, Bickley; Henryk Turczanski, Beckenham, and Frederick Henry Wallis, Tunbridge Wells, all of England, assignors to Comtelco (U.K.) Limited, Tonbridge Kent, England

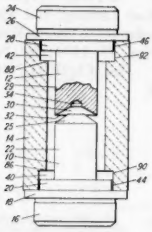
Filed Dec. 11, 1973, Ser. No. 423,744
Claims priority, application United Kingdom, May 31, 1973, 25961/73
Int. Cl. 337 *33;* **H01j** *1/94;* **H01k** *79/00*
U.S. Cl. 313—267 **18 Claims**

1. An electrical surge arrestor comprising:

first and second axially symmetric electrical discharge electrodes, each formed of a unitary solid block of the same material consistency throughout, each block having an electrical discharge surface formed in one end face thereof, a peripheral flange extending transversely of the central axis of the block, a location portion contiguous with one side of said flange and extending therefrom along said axis and a terminal portion contiguous with the opposite side of said flange and extending therefrom along said axis; and

an insulative sleeve of uniform internal cross-section at least over a major portion of its length and into each end of which said electrodes are respectively received;

said peripheral flange of each electrode being seated against and hermetically sealed to a respective end face of said sleeve to form a sealed chamber and said location portion of each electrode being fitted in a respective end of said sleeve to align the electrodes along a common axis centrally within said sealed chamber;



said electrodes being dimensioned to provide an annular gap between the electrodes and the confronting inner surface of said sleeve and to define a discharge gap between confronting discharge surfaces of said electrodes; the discharge surfaces of said electrodes being shaped to provide relative male and female confronting surfaces;

said electrodes and said sleeve being constructed of materials having substantially the same coefficient of thermal expansion.

3,878,424

ELECTRON BEAM GENERATING SOURCE

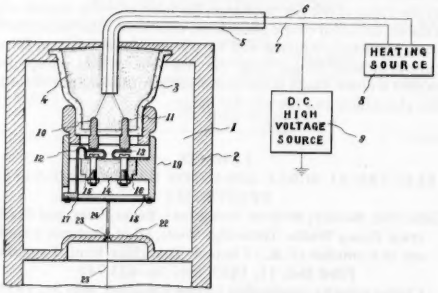
Tadao Suganuma, Tokyo, Japan, assignor to Nihon Denshi Kabushiki Kaisha, Tokyo, Japan

Filed July 17, 1973, Ser. No. 380,100

Claims priority, application Japan, July 20, 1972, 47-72865

Int. Cl. H01j *1/20, 19/14*

U.S. Cl. 313—337 **4 Claims**



1. A thermionic narrow electron beam generating source comprising a cathode and anode arranged in a vacuum chamber, the opposite and facing surfaces of said cathode and anode being substantially flat and parallel and a source for applying high voltage between said cathode and anode such that an electrostatic field is formed between said two electrodes which is parallel and perpendicular to said surfaces, said cathode comprising a plate having a centrally located thermionic electron point emitting means, and said anode having an aperture therein about an optical axis perpendicular to each electrode and extending through the emitting means and means for supplying heat to a small area of the cathode plate at the optical axis whereby the electron beam generated thereby is substantially free of lens effects.

3,878,425

VACUUM - TIGHT CARBON BODIES

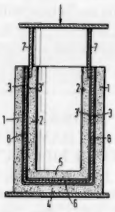
Helmut Katz, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Aug. 24, 1973, Ser. No. 391,459

Claims priority, application Germany, Sept. 8, 1972, 2244267

Int. Cl. H01j *1/02, 1/14, 1/38, 19/30, 19/06*

U.S. Cl. 313—352 **2 Claims**



1. A gas-impermeable member comprising a collector electrode which forms a housing wall portion in a high capacity electric discharge vessel, said member being comprised of at least two substantially permanently joined body members composed of carbon and having adjacent contacting surfaces; a solid protective layer of rhenium or each of said contacting surfaces; and

a layer of a metal solder composed of a metal selected from the group consisting of Cu, Ag, Au and alloys thereof on said rhenium layers whereby a gas-impermeable seal is defined between said carbon body members.

3,878,426

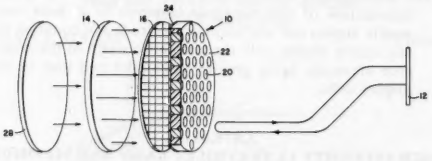
IMAGE STORAGE MATRIX

Ralph L. Norman, 3644 Marymont Dr., N.W., Huntsville, Ala.; Jerry W. Hagood, 307 Mountain Gap Rd., S.E., Huntsville, Ala. 35803, and Joe Shelton, 700 Tatom St., N.W., Huntsville, Ala. 35805

Filed Oct. 10, 1973, Ser. No. 405,230

Int. Cl. H01j *31/28*

U.S. Cl. 313—376 **4 Claims**



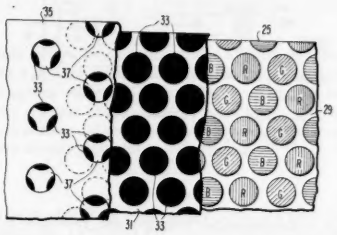
2. In an image device for converting an optical image into video signals and having an imaging section and a thin film target section, the improvement comprising: a metal-oxide, image storage matrix target for providing enhanced face to face conduction, electrical energy storage, and high resistance to lateral charge migration, said matrix target being a thin sheet of oxide-metal composite having several million parallel metal fibers per square centimeter disposed normal to the sheet surfaces for conducting electrons between surfaces of said sheet, and an oxide insulator between respective fibers for resisting lateral charge migration; a photocathode aligned on a first side of said target for directing photoelectrons thereto; and a screen grid disposed on a second side of said target for developing an electric field across said target to enhance electron migration from the target toward the grid.

3,878,427

APERTURED-MASK CATHODE-RAY TUBE HAVING HALF-TONE ARRAY OF HEAT-ABSORBING AREAS ON TARGET SURFACE

Richard Hugh Godfrey, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 5, 1973, Ser. No. 329,619
Int. Cl. H01j *29/06, 31/20*
U.S. Cl. 313—402 **5 Claims**



1. A cathode-ray tube comprising an evacuated envelope including a viewing window, a target structure including a viewing screen comprised of a mosaic of phosphor areas of different emission colors supported on the inner surface of said viewing window, a mask having therein an array of apertures in register with phosphor areas of said viewing screen, said mask being mounted in the tube in adjacent spaced relation with said viewing screen, and means for projecting three electron beams towards said viewing screen for selectively exciting said phosphor areas of each different emission color to luminescence, said target structure having a heat-reflecting surface facing said mask and a half-tone pattern of heat-absorbing areas of dark-colored particulate material on said heat-reflecting surface facing said mask, said half-tone pattern of heat-absorbing areas providing relatively fast radiative heat transfer from said mask to said screen, said heat absorbing areas being graded and having the property of providing greater heat transfer in the central portion of said viewing screen and lesser heat transfer in the peripheral portions of said viewing screen.

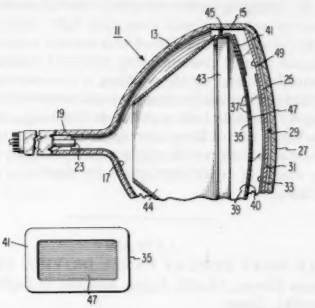
3,878,428

CATHODE RAY TUBE HAVING SHADOW MASK AND SCREEN WITH TAILORED HEAT TRANSFER PROPERTIES

Henry William Kuzminski, Ephrata; Frank Myung-Hi Sohn, Leola, both of Pa., assignors to RCA Corporation, New York, N.Y.

Filed Dec. 29, 1972, Ser. No. 319,375
Int. Cl. H01j *29/16*
U.S. Cl. 313—408 **10 Claims**

6. A cathode-ray tube comprising an evacuated envelope including a rectangular viewing window, an electron gun mounted within said envelope, a rectangular viewing screen comprised of a mosaic of phosphor areas of different emission colors supported on the inner surface of said viewing window, and a rectangular shadow mask mounted in the envelope in adjacent spaced relation with said screen, said mask having an array of apertures in register with phosphor areas of said screen, the facing surfaces of said mask and said screen having surface means including a metallic layer that is selectively reflective of heat and a coating that is selectively absorptive of heat arranged to provide relatively faster radiative heat



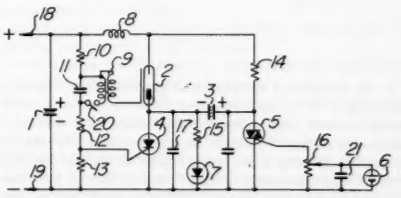
transfer from said mask to said screen in the central portion of said mask than at peripheral portions thereof.

3,878,429

ELECTRONIC FLASH DEVICE WITH AUTOMATIC LIGHT CONTROL

Hiroshi Iwata, 131, Higashi-5-chome, Shiginocho, Osaka, Japan

Continuation of Ser. No. 202,559, Nov. 26, 1971, abandoned.
This application Aug. 27, 1973, Ser. No. 392,077
Claims priority, application Japan, Nov. 14, 1968, 43-84325
Int. Cl. H05b *37/02*
U.S. Cl. 315—151 **5 Claims**



5. A flashlight discharge lamp control system comprising: a DC power source; a main discharge capacitor connected across said DC power source; a discharge circuit comprising a serially connected flashlight discharge lamp and a first control element, said discharge circuit being connected across said power source; means for simultaneously triggering said flashlight discharge lamp and said first control element, said simultaneous trigger means comprising a series circuit of a trigger means comprising a series circuit of a trigger capacitor and voltage dividing resistors connected across said main discharge capacitor and further comprising a trigger transformer having a primary winding connected across said trigger capacitor through a switch, the output terminal of said voltage dividing resistors being connected to the gate of said first control element, thereby upon contacting the switch the trigger capacitor discharges through the primary winding to produve a high trigger voltage in the secondary winding of the trigger transformer and at the same time a divided voltage of said main discharge capacitor is developed in the voltage

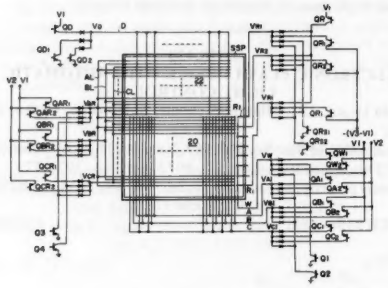
dividing resistors to render said first control element conductive; light receiving circuit means for sensing the light reflected from an object and for providing a control voltage signal corresponding to an integrated value of the amount of reflected light; a control circuit comprising a serially connected second control element and a control capacitor connected for charging from said power source; means applying said control voltage signal from said light receiving circuit means to control conduction of said second control element, said second control element being rendered conductive upon said control voltage signal reaching a predetermined value; means to discharge said control capacitor upon conduction of said second control element, wherein discharge current from said discharge circuit flows through said first control element in a reverse direction with respect to its normal conduction thereby resulting in termination of the discharge of said discharge lamp.

3,878,430

SELF SHIFT DISPLAY PANEL DRIVING SYSTEM

Tadatsugu Hirose, Akashi, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed June 19, 1973, Ser. No. 371,477
Claims priority, application Japan, June 22, 1972, 47-62768
Int. Cl. H01j *65/00*; **H05b** *41/30*
U.S. Cl. 315—169 TV **11 Claims**



1. An energizing system for a gas discharge display panel including a first base plate and a first set of electrodes disposed thereon, and a second base plate and second set of electrodes disposed thereon to traverse said first set of electrodes for defining a discharge region at each of the intersections of said electrodes of said first and second sets, and said first and second base plates confining a discharge gas therebetween, said display panel having the characteristics that a firing voltage of a first magnitude applied between said electrodes of said first and second sets causes a discharge spot in the discharge region and a sustain voltage of a second magnitude less than the first magnitude applied between said electrodes of said first and second sets sustains said discharge spot in the discharge region, said energizing system comprising:

means for supplying a shift voltage pulse of a third magnitude less than the first magnitude and greater than the second magnitude,

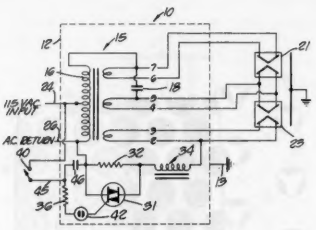
means for applying said shift pulse, in a given time interval, between the electrodes of said first and second sets defining a discharge region at which a discharge spot exists and which is to be shifted to an adjacent discharge region and simultaneously applying a shift pulse between the electrodes of said first and second sets defining said adjacent discharge region and, in a successive time interval, applying a shift pulse only to said electrodes defining said adjacent discharge region and thereby to shift the discharge spot to the said adjacent discharge region.

3,878,431

REMOTELY CONTROLLED DISCHARGE LAMP DIMMING MODULE

Robert J. Petrina, Costa Mesa, Calif., assignor to Bruce Industries, Inc., Gardena, Calif.

Filed Mar. 13, 1973, Ser. No. 340,910
Int. Cl. H05b *41/38*, *41/392*
U.S. Cl. 315—195 **3 Claims**



1. An electromagnetic shielded and remotely controlled dimming circuit for a ballast-transformer operated discharge lamp lighting means comprising

a ballast-transformer module of electromagnetic shielding material, said module containing a ballast-transformer circuit including a starting capacitor in the secondary windings and output leads for connection to discharge lamps,

first means to supply electrical power to said ballast-transformer circuit,

solid state gate means within said module for full wave control of relatively large amounts of electrical power by a relatively low level biasing electrical input signal, said gate means being capable of being biased for constant conduction in one state and for non-conduction in another state,

gate trigger means in said module and connected to said gate means for biasing said gate means to one of said states, said gate means being so connected that during constant conduction full current is supplied to said ballast-transformer circuit,

dimming resistor means electrically in parallel with said gate means and being so connected that during non-conduction of said gate means current passes through said dimming resistor to supply less than full current to said ballast-transformer circuit,

gate trigger control means locatable externally of said module for controlling said gate trigger means,

said first means also supplying power to said gate trigger means and said gate means,

said gate trigger means further including neon lamp means dischargeable above a predetermined voltage to permit flow of full current in said ballast-transformer circuit subsequent to biasing said gate means to a conductive condition and at a voltage below said predetermined voltage operative in cooperation with said dimming resistor to permit flow of less than full current, and

said gate trigger control means controlling at least two modules.

3,878,432

CONTACTLESS IGNITION SYSTEM

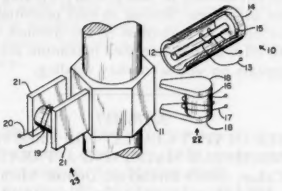
Clement A. Skalski, 79 Goodman Hill Rd., Sudbury, Mass. 01776

Filed Feb. 16, 1971, Ser. No. 115,574
Int. Cl. H05b *37/02*; **H01v** *5/00*
U.S. Cl. 315—209 T **15 Claims**

1. Electromagnetic transducing apparatus comprising,

a cylindrical magnet surrounded about its axis by a coil of wire,

and substantially planar pole pieces affixed to the ends of said cylindrical magnet,



said pole pieces being tapered and aligned with their tips along a line for facing one edge at a time of a cam made of magnetic material for rotation about an axis thereof,

whereby rotation of said cam produces a sequence of sharp pulses across said coil of wire as each edge of the said cam passes closely adjacent to said tips.

3,878,433

PHOTOGRAPHIC FLASHLIGHT APPARATUS WITH IMPROVED AUTOMATIC LIGHT TERMINATION MEANS

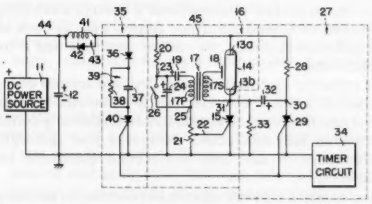
Fukuji Sato, Tokyo, Japan, assignor to Sato Koki Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 259,475, June 5, 1972, abandoned. This application Dec. 17, 1973, Ser. No. 425,098

Claims priority, application Japan, Nov. 17, 1971, 46-92104; Dec. 14, 1971, 46-101258

Int. Cl. H05b *41/32*

U.S. Cl. 315—241 P **22 Claims**



1. In a photographic flashlight apparatus comprising:

a flash capacitor connected across a dc source of a predetermined voltage;

a flashlight source connected across said flash capacitor and including a flash tube and a thyristor which are simultaneously rendered conductive upon the shutter operation of a photographic camera so as to initiate a light emission by said flash tube; and

an automatic light termination means disposed across said flash capacitor and including a quench element, a timer circuit coupled with said quench element so as to cause said quench element to be turned on a predetermined period of time after the emission of light is initiated by said flash tube, and a flash termination capacitor coupled with said thyristor included in said flashlight source and said quench element and precharged with voltage corresponding to that of said dc source for effecting discharge upon the conduction of said quench element by said timer circuit through said conducting quench element, said flash capacitor and said flashlight source so as to turn off said thyristor;

the improvement comprising:

an exposure correction means including a series arrangement which is connected across said flash capacitor and which includes a switch element coupled with said timer circuit so as to be made conductive simultaneously with said quench element, and a parallel circuit which includes a resistor and a bypass capacitor coupled in parallel with said resistor, said parallel circuit being operative to shunt through said conducting switch element at least part of an over-flash current which might otherwise flow into said flash tube upon the flash termination thereof.

3,878,434

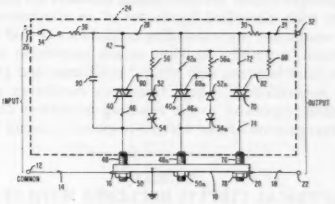
POWER-LIMITING ELECTRICAL BARRIER DEVICE

Ernst W. Voorhoeve, Maple Glen, Pa., assignor to Leeds & Northrup Company, North Wales, Pa.

Filed Dec. 10, 1973, Ser. No. 423,335

Int. Cl. H02h *3/20, 3/08*

U.S. Cl. 317—16 **14 Claims**



1. An electrical barrier for interconnecting an input between an input terminal and a grounded bus to an output between an output terminal and a grounded bus so that the power transmitted between the input and output is limited to a safe magnitude, comprising:

an input lead for receiving a potential with respect to ground representative of the input,

an output lead for providing a potential with respect to ground representative of the output,

a pair of triacs each having one of its main terminals connected to said input lead and the other main terminal adapted for connection to said grounded bus,

a series connected back-to-back zener diode string and isolating device for each of said triacs, said series circuits each being connected between said output lead and said other main terminal of each triac to allow current through said diode string only when the power signal exceeds the zener voltage of said diodes,

means connecting the gate of each of said triacs to an associated one of said series circuits at a point such that said series connected device is between said gate and said output lead, whereby an excessive voltage causes the gate of one of the triacs to make the triac conductive so as to short circuit the input lead to ground,

a third triac having one of its main terminals connected to said input lead and the other main terminal connected by a lead to means adapted for connection to said grounded bus,

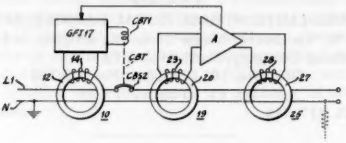
an isolating device connected between said output lead and the gate of said last named triac, and

a current detecting resistor connecting said input and output leads, said resistor being of a value such that an excessive current flowing through it will cause the gate of one of said triacs to make it conductive to thereby short said input lead to ground.

3,878,435
DORMANT OSCILLATOR GROUND TO NEUTRAL PROTECTION FOR GROUND FAULT INTERRUPTERS

Donald L. Van Zeeland, Franklin, and Russell P. Schuchmann, Racine, both of Wis., assignors to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Jan. 21, 1974, Ser. No. 434,988
Int. Cl. H02h 3/28
U.S. Cl. 317—18 D 6 Claims

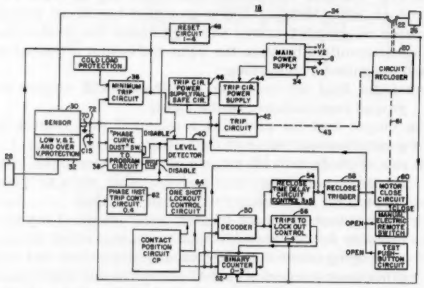


1. In a ground fault interrupter for an alternating current distribution circuit which has a neutral electrically grounded conductor and at least one electrified conductor, of an electro-responsive circuit breaker having contacts for connection between each electrified conductor of an alternating circuit supply source and corresponding conductors of said distribution circuit, normally dormant means responsive to a low resistive fault between said neutral conductor and ground to initiate generation of a high frequency oscillatory potential and means responsive to the resulting oscillatory current to effect energization of said electro-responsive circuit breaker.

3,878,436
ELECTRICAL CIRCUIT RECLOSER WITH STATIC CONTROL

George F. Bogel, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 20, 1973, Ser. No. 417,694
Int. Cl. H02h 3/08
U.S. Cl. 317—22 3 Claims



1. An electric circuit recloser, comprising

separable main contacts for interconnecting an electrical circuit connected thereto;

means for opening and closing said separable main contacts in response to a stimulus;

a control for providing said stimulus;

a power supply for empowering said control, said power supply having a regulating means therein to regulate the output voltage of said power supply;

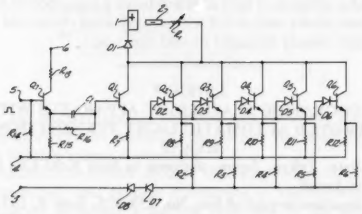
a sensor for monitoring said electrical circuit to thereby provide information about the fault status of said electrical circuit to said control; and

a transformer having a primary winding, a secondary winding, and auxiliary winding, and a potential developing resistor connected across said primary winding, said primary winding being connected to said sensor, said secondary winding being connected to said control, said auxiliary winding being connected to said power supply, said auxiliary winding interacting with said regulating means of said power supply to generally fix the maximum value of voltage which may appear across said secondary winding regardless of the fault status of said electrical circuit by electromagnetically controlling the amount of electrical current flowing in said primary winding to keep the amount of current flowing in said potential developing resistor constant regardless of the amount of said fault current after a predetermined maximum secondary voltage appears on said secondary winding.

3,878,437
POWER OUTPUT CIRCUIT FOR ELECTRICAL DISCHARGE MACHINING APPARATUS

Seymour Cuker, 18955 Birchcrest, Detroit, Mich. 48221

Filed Mar. 28, 1973, Ser. No. 345,483
Int. Cl. H02h 3/20, 7/22
U.S. Cl. 317—33 VR 3 Claims



1. In an apparatus for machining a conductive workpiece by passing electrical pulses between a tool electrode and said workpiece across an arc gap therebetween, wherein the improvement comprises:

a first electronic control device having a collector electrode, an emitter electrode and a control electrode;

a plurality of second electronic control devices each having a collector electrode, an emitter electrode and a control electrode;

said collector electrodes of said first and second electronic control devices being electrically connected together;

a first unidirectional electrical device electrically connected between said conductive workpiece and said collector electrodes of said first and second electronic control devices;

a first resistive network electrically connected between said tool electrode and said collector electrodes of said first and second electronic control devices;

first and second terminals electrically connected to said emitter electrode and said control electrode, respectively, of said first electronic control device;

said emitter electrodes of said plurality of second electronic control devices being electrically connected to said first terminal;

a plurality of second unidirectional electrical devices,

each of said second unidirectional electrical devices being electrically connected to and associated with a respective one of said second electronic control devices in such a manner that said second unidirectional electrical device is electrically connected between said control electrode of its associated second electronic control device and said emitter electrode of said first electronic control device,

pre-driver circuit means interposed between said first and second terminals and said first electronic control device, said pre-driver circuit including an additional electronic control device having an emitter electrode coupled to said control electrode of said first electronic control device through a parallel combination of a reactive element and a resistive element, said additional electronic control device having a control electrode coupled to said second terminal and an emitter electrode coupled to said first terminal;

a protector circuit electrically connected to said emitter electrodes of said second electronic control devices for detecting a malfunction of any one of said second electronic control devices; and

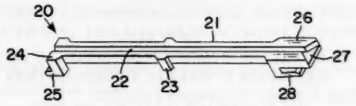
said protector circuit including a plurality of first resistive elements each being electrically connected between a respective emitter electrode of said second electronic control devices and at least a third unidirectional electrical device.

3,878,438

PRINTED CIRCUIT CARD GUIDE

Arnold M. Weisman, Los Angeles, Calif., assignor to William Jacobs a/k/a Calmark, San Marino, Calif.

Filed Sept. 28, 1973, Ser. No. 401,895
Int. Cl. H02b *1/02*
U.S. Cl. 317—101 DH **4 Claims**



1. An apparatus for containing, electrically isolating and cooling circuit cards comprising:

a. a chassis having a top frame and a bottom frame, said top and bottom frames being generally channel shaped having two flanges and a web disposed such that said flanges increase the rigidity of said frames, while said web, supports said circuit cards, said web having a plurality of web sections defining openings, wherein a substantial portion of the sides of said web sections are parallel;

b. a card guide being generally elongated with a rectangular cross section, said card guide having;

1. a body containing a generally rectangular shaped trough disposed along the longitudinal axis of said body, said trough having a width slightly larger than the thickness of said circuit cards;

2. a first end having two tabs which are positioned beneath said body a distance approximately equal to the thickness of said frame, said tabs project outwardly from said first end, said tabs being positioned on each side of said body such that said tabs each engage the bottom of said frame in adjacent openings;

3. a second end having two tabs which are positioned beneath said body a distance approximately equal to the thickness of said frame, said tabs positioned so as to extend toward said second end such that the distance between said tabs on said first end and said tabs on said second end is approximately equal to the length of said opening, said tabs disposed on each side of said body such that said tabs each engage the bottom of said frame in adjacent openings; and

4. a pair of longitudinal guides disposed on the side of said body and extending downward from said body such that each tab engages a side of said web section in adjacent openings;

whereby said card guide may be disposed on and supported by said thin web section, and said circuit cards may be contained within said chassis.

3,878,439

LIGHT CONTROLLED CIRCUIT

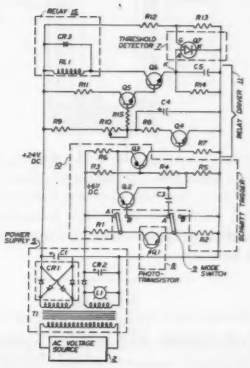
David F. Crozier, Chester Springs, Pa., assignor to American Manufacturing Company, Inc., King of Prussia, Pa.

Filed Mar. 29, 1973, Ser. No. 345,881
Int. Cl. H01h *47/26*
U.S. Cl. 317—130 **2 Claims**

1. A circuit comprising:

a. a branch including a load resistor and light-sensitive means for generating output signals corresponding to the light input condition of said light sensitive means,

b. a Schmitt trigger circuit coupled to the output of said light-sensitive means, said trigger circuit including first and second switching means coupled to one another, said first switching means being coupled to said load resistor and changing condition whenever said light-sensitive means changes condition, said second switching means changing condition in response to a change in condition



of said first switching means, said trigger circuit being directly coupled to said branch,

c. a third switching means coupled to said second switching means which changes condition in response to a change in condition of said second switching means, and

d. a utilization circuit coupled to said third switching means which is actuated in response to a predetermined change in the condition of said third switching means, said utilization circuit remaining acutated until said light-sensitive means next changes condition.

3,878,440

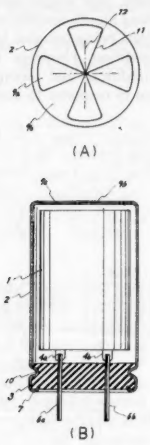
ELECTROLYTIC CAPACITOR VENT

Susumu Ando, Minamiazumi, Japan, assignor to Nichicon Capacitor Limited, Kyoto, Japan

Filed July 23, 1973, Ser. No. 381,807
Int. Cl. H01g *9/12*
U.S. Cl. 317—230 **1 Claim**

1. An electrolytic capacitor comprising a cylindrical housing, a wall integrally formed with said housing and closing one end thereof, an electrolytic capacitor within said housing and having terminals extending therefrom, and means closing the other end of said housing with the terminals extending therethrough, said wall having a plurality of wedge-shaped sectors angularly spaced one from the other and radiating outwardly from a common center, the wall portions forming said sectors

each having a thickness less than the remaining portions of said wall whereby said sectors form a precise pressure release

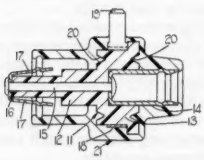


means should the pressure exceed a predetermined magnitude within said housing.

3,878,441
CAPACITOR

Leonard Keith Skinner, Birmingham, England, assignor to The Lucas Electrical Company Limited, Birmingham, England

Filed Mar. 7, 1973, Ser. No. 338,944
Claims priority, application United Kingdom, Mar. 14, 1972, 11718/72
Int. Cl. H01g *1/14*
U.S. Cl. 317—257 **4 Claims**

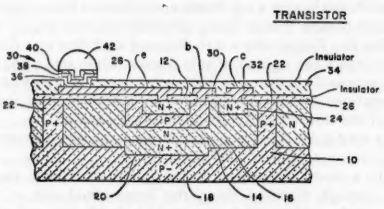


1. A capacitor for use in a circuit having first and second complementary shaped mating and releasably engageable circuit elements, comprising:
an insulating body;
a conductor assembly carried by the body and including
a first terminal member accessible at one end of said body and including a hollow conductive sleeve arranged to internally receive the first mating circuit element,
a second terminal member accessible at the other end of said body and including a spring means plug part arranged to be received in the second mating circuit element, and
a conductive rivet means having a width less than the width of said first and second terminal members extending within said body and electrically interconnecting said first and second terminal members;
a metal strip on the exterior of said body having a third terminal member connected thereto;
said strip constituting a first capacitor plate, said first terminal member constituting a second capacitor plate and said body including a solid dielectric material between said first and second plates and in direct contact with said conductive rivet means; and
an outer casing of insulating material about said body leaving said first, second and third terminal members accessible but enclosing at least said metal strip constituting said first capacitor plate,
said sleeve having a portion projecting from said body and the outer surface of said projecting portion being encircled by said outer casing,
said outer casing being arranged adjacent to said second terminal member to encircle the second mating circuit element engaging said second terminal member in use.

3,878,442
ELECTRICAL CONDUCTOR HAVING A HIGH RESISTANCE TO ELECTROMIGRATION

Harshad J. Bhatt, Wappingers Falls, N.Y.

Division of Ser. No. 40,635, May 26, 1970, Pat. No. 3,647,119. This application Oct. 1, 1971, Ser. No. 185,672
Int. Cl. H01l *5/00*
U.S. 357—67 **7 Claims**



1. An electrical conductor comprising an aluminum alloy having a high resistance to electromigration, said aluminum alloy being composed of aluminum and aluminum oxide, said aluminum oxide is in the range from about 0.01 percent to about 5 percent of said aluminum alloy.

3,878,443
CAPACITOR WITH GLASS BONDED CERAMIC DIELECTRIC

Roland T. Girard, Scotia, and George A. Rice, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed July 27, 1973, Ser. No. 383,280
Int. Cl. H01g *1/01, 3/06*
U.S. Cl. 317—258 **18 Claims**

1. A capacitor comprising:
a first electrode comprising an electrically conductive metal;
a layer of dielectric material comprising barium titanate and an alkali-free glass binder having at least the electropositive element barium therein which is a common electropositive element to the element present in the dielectric

material disposed on, and in an electrically conductive relationship with, the first electrode;

the alkali-free glass binder comprises the following formulation:

Ingredient	% By weight
BaO	38 to 46
ZnO	7 to 11
SiO_2	35 to 45
B_2O_3	6 to 8
Al_2O_3	2 to 5

and

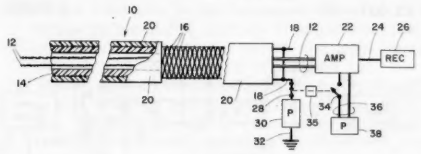
a second electrode comprising an electrically conductive metal disposed on, and in an electrically conductive relationship with, the layer of dielectric material.

3,878,444

METHOD AND APPARATUS FOR PROTECTING ELECTRICAL FIELD CABLES AGAINST RODENT DAMAGE

Shelond M. Miller, Tulsa, Okla., assignor to Tesco Engineering Company, Tulsa, Okla.

Filed Jan. 21, 1974, Ser. No. 435,210
Int. Cl. H05c *1/00*; **H01b** *7/00*
U.S. Cl. 317—262 S **9 Claims**



1. An improved multiple conductor electrical field cable system, comprising;

a. an improved cable comprising;

1. a plurality of insulated conductors forming a cylindrical core;
2. a jacket surrounding and binding said conductors;
3. a conductive wrapping around said jacket for a substantial portion of the length of said cable; and
4. covering means over said cable and wrapping;

b. electrical means to utilize said electrical conductors;

c. means to apply an electrical potential of selected magnitude between said wrapping on said cable and earth ground; and

d. wherein said means to apply comprises first switch means to apply potential to said wrapping, second switch means to apply power to said means to utilize said conductors, and means to keep said first switch open when said second switch is closed and vice versa.

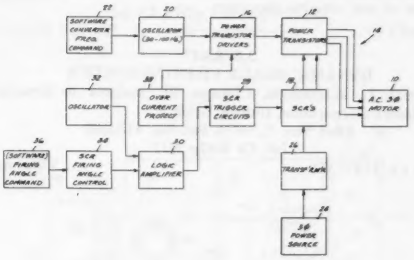
3,878,445

A. C. MOTOR CONTROL APPARATUS AND METHOD

Edward E. Kirkham, Brookfield; Frank Zankl, Milwaukee; Richard E. Stobbe, Greenfield, and John J. Schachte, Wauwatosa, all of Wis., assignors to Kearney & Trecker Corporation, Milwaukee, Wis.

Filed Sept. 1, 1972, Ser. No. 285,813
Int. Cl. G05b *13/02*, *15/02*
U.S. Cl. 318—308 **12 Claims**

1. A servo system for controlling the application of electrical power to an a.c. motor, comprising means for generating a signal representative of the speed of said motor, frequency selecting means for selecting the frequency of an a.c. voltage to be applied to said motor, means for providing an input signal representative of a selected angular position for said motor, means for deriving a control signal in response to said input signal and to said speedrepresentative signal, and amplitude selecting means responsive to said control signal for selecting an amplitude for said a.c. voltage which amplitude is determined in accordance with a predetermined relation between the torque developed by said motor and the amplitude of an a.c. voltage applied thereto at said selected frequency,



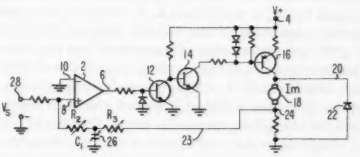
whereby the torque developed by said motor has a predetermined relation to said control signal, and means for connecting a source of electrical power to said motor, said last named means being connected with, and responsive to, said frequency selecting means and said amplitude selecting means.

3,878,446

CURRENT REGULATOR FOR D.C. MOTORS

Arnold W. Brandt, Milford, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Mar. 29, 1973, Ser. No. 345,844
Int. Cl. H02p *5/06*
U.S. Cl. 318—317 **1 Claim**



1. A motor control circuit comprising:

a bistable comparator circuit for comparing a single voltage representation of the motor current to a reference voltage;

transistor switching means responsive to said bistable comparator circuit for connecting and disconnecting a power source to the motor;

current bypass means for allowing the current generated by the inductive reactance of the motor to flow back through the motor when the power source has been disconnected; and

feedback means, including a pair of series connected viarable resistors connected in series directly between said bistable comparator circuit and said motor, and a variable capacitor connected in common with said first and second variable resistors, for governing the switching rate of said bistable comparator circuit in accordance with the equation.

$$T = \frac{R_2 \cdot R_3}{R_2 + R_3} C_1$$

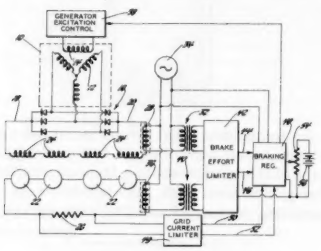
T representing the time between said disconnecting and said connecting, R_2 representing the resistance of either of said pair of variable resistors, R_3 representing the resistance of the other of said variable resistors, and C_1 representing the capacitance of said variable capacitor.

3,878,447

DYNAMIC BRAKE LIMITING SYSTEM

Norman L. MacDonald, Chicago, Ill., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 7, 1973, Ser. No. 413,600
Int. Cl. H02p *3/12*
U.S. Cl. 318—375 **3 Claims**



1. A dynamic brake control system comprising: at least one electrical machine including a variably driven armature and a field winding; a dynamic braking grid resistance connected across the armature; energizing means for variably energizing the field winding; a first current sensor responsive to current through the field winding for generating a first signal having a magnitude defined by the expression $K_1 I_1$ where K_1 is a constant and I_1 is the magnitude of the current through the field winding; a second current sensor responsive to current through the dynamic braking grid resistance for generating a second signal having a magnitude $K_2 I_2$ where K_2 is a constant and I_2 is the magnitude of the current through the dynamic braking grid resistance; means connected to the first and second current sensors for generating a limit signal when the magnitude of the sum $K_1 I_1 + K_2 I_2$ is equal to a specified value; and regulating means coupled between the last mentioned means and the energizing means for controlling the energizing means in response to the limit signal to limit the magnitude of the sum $K_1 I_1 + K_2 I_2$ to the specified value to thereby limit the braking effort of the electrical machine.

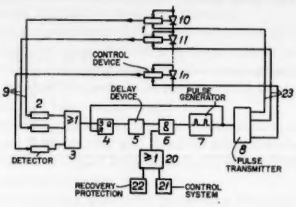
3,878,448

CONTROL CIRCUIT FOR A THYRISTOR RECTIFIER

Per-Olof Jackson; Lars-Erik Juhlin, and Brent Ostlund, all of Ludvika, Sweden, assignors to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed June 5, 1973, Ser. No. 367,100
Claims priority, application Sweden, June 21, 1972, 8150/72
Int. Cl. H02m *1/08*
U.S. Cl. 321—11 **6 Claims**

1. Thyristor rectifier for high voltage comprising a plurality of series-connected thyristors (**10-1n**), each provided with a control device (**1**) and a control circuit for the whole rectifier, the control devices being controlled from a control pulse transmitter (**8**) in the control circuit and provided with a signal emitter which emits an indicating signal when the voltage in the conducting direction of the relevant thyristor reaches a certain value and the control circuit comprising an input circuit (**20**) to which signals for ignition of the whole thyristor rectifier are connected, in which an AND-gate (**6**)



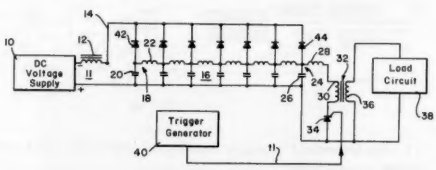
connects said signal emitter and said input circuit to said control pulse transmitter, and an OR-gate (**3**) connects the different signal emitters to the AND-gate.

3,878,449

HIGH PULSE RATE, HIGH DUTY FACTOR LINE MODULATOR TYPE PULSE GENERATORS

Frank A. Wilhelmi, Simi, and Ben Ifune, Torrance, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed June 7, 1973, Ser. No. 367,935
Int. Cl. H02m *7/00*
U.S. Cl. 321—15 **6 Claims**



1. A line modulator type pulse generator for applying pulses of electrical energy to a load circuit, said generator comprising: a pulse forming network adapted for storing electrical energy and having a plurality of capacitance elements intercoupled by a plurality of inductance elements such that first terminals of each of said capacitance elements are interconnected, and second terminals of said capacitance elements are intercoupled through said inductance elements so as to form a plurality of energy storage stages with each energy storage stage comprising one of said capacitance elements; voltage supply means for resonant charging said pulse forming network, said voltage supply means including a pair of output terminals with one of said output terminals connected to said first terminals of said capacitance elements; switching means coupled across one of said energy storage stages for periodically applying energy from said pulse forming network to the load circuit; and wherein the improvement comprises a plurality of unidirectional current conducting devices coupled between said pulse forming network and said voltage supply means such that the second terminal of each one of a preselected plurality of said capacitance elements is coupled through an associated unidirectional current conducting device to the other output terminal of said voltage supply means.

3,878,450

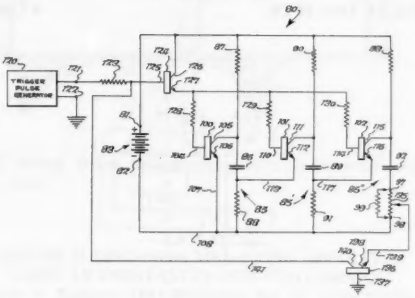
CONTROLLED VOLTAGE MULTIPLIER PROVIDING PULSE OUTPUT

Wilson Greatbatch, Clarence, N.Y., assignor to Wilson Greatbatch, Ltd., Clarence, N.Y.

Filed Apr. 29, 1970, Ser. No. 32,942
Int. Cl. H02m *3/02*
U.S. Cl. 321—15 **18 Claims**

13. A voltage multiplier comprising:

a. a pair of input terminals adapted for connection to a source of relatively low voltage to be multiplied;
b. a plurality of circuit branches connected in parallel with said terminals, each of said branches including a capacitor and means developing a voltage on said branch;
c. a pair of output terminals adapted for connection to a load, said terminals being connected in series with one of said capacitors;



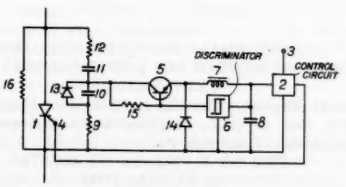
d. means connected to said capacitors for defining a discharge path including said pair of output terminals and connected directly to the one of said input terminals which is at ground or reference potential; and
e. regulating means connected to said output terminals and to said discharge path defining means for stopping the flow of current through said path when the voltage on said output terminals reaches a predetermined magnitude.

3,878,451

THYRISTOR CIRCUIT

Bernt Ostlund, and Lars-Erik Juhlin, both of Ludvika, Sweden, assignors to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed Nov. 7, 1973, Ser. No. 413,596
Claims priority, application Sweden, Dec. 8, 1972, 16004/72
Int. Cl. H02m *1/08*
U.S. Cl. 321—27 R **4 Claims**



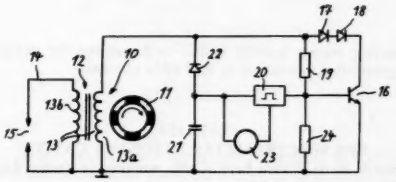
1. Thyristor circuit comprising a thyristor (**1**), a control circuit (**2**) having an input terminal (**3**) and being connected to the control electrode (**4**) of the thyristor, voltage-regulator means connecting said control circuit with the thyristor circuit across the anode and cathode of the thyristor for supplying the voltage across the thyristor to the control circuit, said voltage-regulator means comprising a switch member (**5**) for opening and closing the circuit and a control member (**6**) dependent on the voltage in the control circuit for controlling the switch member, said control member including discriminator means with upper and lower voltage switching levels for providing a predetermined range of voltage in the control circuit independently of oscillations in the thyristor voltage.

3,878,452

TRANSISTORIZED MAGNETO IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES

Georg Haubner, Berg; Walter Hofer, Schwabach, and Peter Schmaldienst, Nurnberg, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed July 31, 1973, Ser. No. 384,282
Claims priority, application Germany, Aug. 29, 1972, 2242325
Int. Cl. F02p *1/00, 1/08, 9/00*
U.S. Cl. 322—17 **13 Claims**



1. In an internal combustion engine ignition system having a magneto armature provided with at least one winding arranged to be excited by a magnetized rotor driven by the engine, and having voltage step-up means coupled with said magneto armature, which means is coupled with a low-voltage winding of said armature and connected by ignition cable to at least one spark plug,

an ignition control circuit for connection to said low-voltage winding of said armature, comprising:

a controllable semiconductor device (**16**) having its switching path in circuit with said low-voltage winding;

pulse signal means to derive a timing signal for ignition and to supply said signal to the control electrode of said semiconductor device (**16**);

at least one diode (**17,18**) connected in series with said switching path of said semiconductor device (**16**) and poled for conduction in the same direction as said switching path, and

resistance means (**19**) for turning on said semiconductor device (**16**) during positive half waves of the output of said low-voltage winding, except while said signal is supplied by said pulse signal means as aforesaid, said resistance means (**19**) having only two terminals connected in said ignition control circuit and being connected by said terminals, between the control electrode of said semiconductor device (**16**) and the terminal of said diode(s) which is farthest from the connection thereof to said switching path.

3,878,453

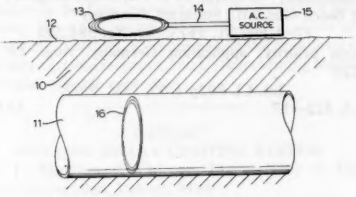
PIPELINE SIGNALLING SYSTEMS AND TECHNIQUES

David W. Potter, West Hill, Ontario, and Frederick V. Topping, Downsview, Ontario, both of Canada, assignors to Trans Canada Pipelines Limited, Toronto, Ontario, Canada

Filed Sept. 21, 1973, Ser. No. 399,473
Int. Cl. G01r *19/16*
U.S. Cl. 324—3 **19 Claims**

1. Apparatus for generating a signal externally of an electrically conductive pipeline and detecting within the pipeline a signal indicative of the presence of the externally generated signal comprising an AC coil having a core and a longitudinal axis, said coil being located externally of said pipeline with said pipeline passing other than through the core of said coil and with at least a part of the imaginary surface created by projecting said AC coil parallel to said longitudinal axis thereof intersecting said pipeline, means for supplying alter-

nating current to said coil to thereby generate magnetic flux and induce eddy currents to flow in said pipeline and flux



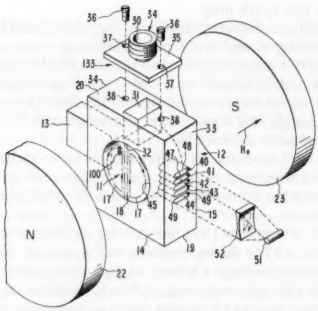
detecting means located within said pipeline for detecting magnetic flux generated by said eddy currents.

3,878,454

EPR SPECTROMETER RESONANT CAVITY

James S. Hyde, Menlo Park, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed July 19, 1973, Ser. No. 380,647
Int. Cl. G01n *27/78*
U.S. Cl. 324—.5 R **6 Claims**



1. An EPR spectrometer resonant cavity container for carrying and supporting a resonant cavity and a sample in said resonant cavity, said cavity being resonant to a microwave frequency and being excited by a low frequency magnetic field, said container including

a resonant cavity,

a first waveguide having a cutoff frequency greater than the resonant frequency of said cavity,

a second waveguide having a cutoff frequency less than the resonant frequency of said cavity, said first waveguide being displaced from said resonant cavity and microwave coupled to said resonant cavity through said second waveguide,

said second waveguide being fixedly connected about an aperture in an interior wall of said cavity, said aperture being symmetrically positioned and configured in said interior wall such that microwave currents in said cavity do not excite the first propagation mode of said second waveguide, and

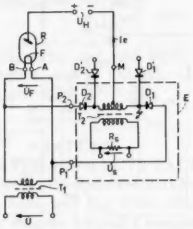
said first waveguide being removably connectable to said second waveguide.

3,878,455

CIRCUIT ARRANGEMENT FOR MEASURING THE FILAMENT EMISSION CURRENT OF A CATHODE-RAY OR X-RAY TUBE

Rudolf Ochmann, Hamburg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 3, 1973, Ser. No. 403,041
Claims priority, application Germany, Oct. 6, 1972, 2249064
Int. Cl. G01r *31/22*
U.S. Cl. 324—20 CR **6 Claims**



1. Circuit arrangement for measuring the filament emission current of a cathode-ray tube, comprising:

a first transformer having means for electrically connecting a secondary winding thereof across a filament of a cathode-ray tube and having means for electrically connecting a primary winding thereof to a suitable source of A.C. voltage for driving said filament with an alternating current;

a second transformer having a primary winding with a center tap and a secondary winding;

means for electrically connecting a source of suitably high D.C. voltage between an anode of said tube and said center tap of said primary winding of said second transformer;

a pair of diodes having their respective anodes electrically connected to opposite ends of said secondary winding of said first transformer and having their respective cathodes electrically connected to opposite ends of said primary winding of said second transformer; and

a resistance electrically connected between opposite ends of said secondary winding of said second transformer developing thereacross a voltage substantially proportional to the filament emission current of said tube.

3,878,456

STANDARD CONDUCTIVITY CELL FOR MEASUREMENT OF SEA WATER SALINITY AND TEMPERATURE

Frank H. Stephan, Columbia, and Robert A. Elmiger, Pasadena, both of Calif., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 9, 1973, Ser. No. 404,576
Int. Cl. G01n *27/42*
U.S. Cl. 324—30 B **7 Claims**

1. A standard cell comprising:

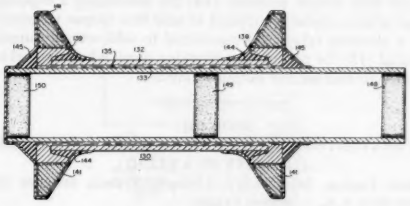
A. first and second electrically insulative cylindrical members, one disposed within the other and defining a relatively thin space therebetween;

B. a thin film of a standard sample of electrcally conducting liquid of a known predetermined parameter disposed in said space and having a thickness less than the thickness of at least one of said insulative cylindrical members; and

C. first and second annular electrodes in electrical contact with said standard sample;

D. the inside one of said cylindrical members extending through the central opening of at least one of said annular electrododes;

E. opposite ends of the outside one of said cylindrical members terminating within respective ones of said annular electrodes; and



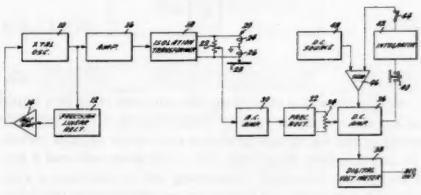
F. sealing means for containing said sample within said space.

3,878,457

THIN FILM THICKNESS MEASURING APPARATUS USING AN UNBALANCED INDUCTIVE BRIDGE

Wayne E. Rodgers, 1523 Princeton, Apt. 6, Santa Monica, Calif. 90404

Filed Nov. 16, 1973, Ser. No. 416,686
Int. Cl. G01r *33/12*
U.S. Cl. 324—34 TK **16 Claims**



1. An apparatus for measuring the thickness of a thin film including;

an inductance bridge having input and output terminals and including at least one reference coil and one sensing coil for sensing the thickness of a thin film located within a magnetic field produced by the sensing coil in accordance with a change in potential of output signals at the output terminals of the bridge and with the bridge including means for maintaining the bridge in an unbalanced state by adjustably controlling the potential of the output signals at the output terminals;

a source of ac drive signals coupled to the input terminals of the inductance bridge;

a source of offsetting potential coupled to the output signals from the bridge for providing a constant offset in the potential of the output signals for providing a zero potential for the combination of the output signal and the offsetting potential when no thin film is located within the magnetic field produced by the sensing coil;

the source of offsetting potential includes a first input of fixed voltage of a constant value and a second input of fixed voltage having a value substantially equal to the difference between zero and the potential of the output signal less the first fixed voltage after adjustment by the means to adjustably control the output signal from the bridge, and

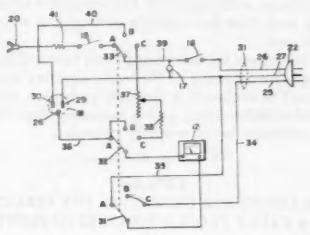
indicator means responsive to the offset output signals to provide output indications in accordance with the unbalance of the inductance bridge representing the thickness of a thin film under measurement.

3,878,458

ELECTRICAL SAFETY TEST APPARATUS FOR DETECTING LEAKAGE CURRENT TRIPPING CURRENT AND PROPER GROUNDING

William A. Muska, 1378 Ryan, Roseville, Minn. 55117

Filed Sept. 12, 1973, Ser. No. 396,419
Int. Cl. G01r *31/02*
U.S. Cl. 324—51 **3 Claims**



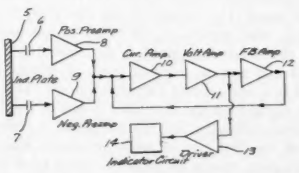
1. Electrical safety test apparatus, comprising in combination: a three-conductor electrical energy cable having a three-pronged plug at one end for receiving electrical energy and adapted to mate with a receptacle in a ground fault interrupter, said cable including an electrical common conductor; a three-socket receptacle for mating with a three-pronged plug of a three wire power cable for an electrically powered tool, said receptacle including an electrical common socket; means for visually indicating electrical current flow; a first circuit adapted to establish a leakage current flow path from the non-common conductor of said energy cable to both non-common sockets of said receptacle through the tool mated therewith and to the common socket; a second circuit including variable resistance means adapted to establish a current flow path from one of the non-common conductors of said energy cable, said second circuit not passing through said receptacle; and manually operable switch means for selectively connecting said current indicating means to said common energy cable conductor and to either said first circuit, in series with said leakage current flow path, for measuring tool leakage current or to said second circuit, in series with said current flow path from one of the non-common conductors, when said energy cable plug is mated with a ground fault interrupter for measuring the ground fault interrupter current.

3,878,459

ELECTROSTATIC FIELD DETECTION METHOD FOR DETERMINING WHETHER APPARATUS IS PROPERLY GROUNDED

Harry A. Hanna, 3826 38th St., Des Moines, Iowa 50310

Filed May 5, 1972, Ser. No. 250,736
Int. Cl. G01r *29/12, 31/02;* **H05f** *3/00*
U.S. Cl. 324—51 **1 Claim**



1. The method of detecting the grounded condition of electric or electronic equipment or apparatus enclosed by a conduction body by detecting the presence of a low voltage alternating electrostatic field radiating from the conductive body housing the equipment or apparatus comprising the steps of:

placing an induction plate means adjacent the conductive body within the alternating electrostatic field, if present,

capacitively coupling the induction plate means to a preamplifier stage, preamplifying the input signal and supplying the preamplified signal to a driven stage,

and connecting a signal emitting means to said driver stage to indicate the detection of the field, the degree of capacitive coupling of said preamplifier stage to the induction plate means and the size and position of said induction plate means with respect to the remainder of said circuit being such that the circuit is activated at a low voltage value, and

determining from the detection of said field and the energizing or nonenergizing of the signal emitting means if the conductive enclosure is properly grounded, energization of said signal emitting means indicating that the conductive enclosure is not properly grounded.

3,878,460

ARRANGEMENT FOR DETECTING THE DIRECTION OF A FAULT FROM A MEASURING POINT

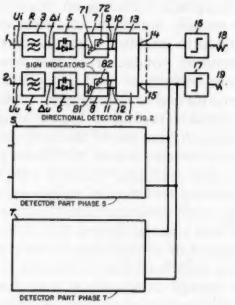
Gunnar Nimmersjo, Vasteras, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed Nov. 1, 1973, Ser. No. 411,806

Claims priority, application Sweden, Nov. 6, 1972, 14324/72

Int. Cl. G01r *31/08*; **H02h** *3/38, 3/22*

U.S. Cl. 324—52 **4 Claims**



1. Directional wave detector for determining, with the help of the direction of movement of a transient wave passing a measuring point at a fault in the network, the direction to the fault which has caused the transient wave and which comprises a detector part (R,S,T,) for each phase in the supervised network, each such detector part (R,S,T) having a first band exclusion filter (**3**) for removing the part of a first signal (U_I), which has the operating frequency of the network, said first signal being proportional to the current at the measuring point, a second band exclusion filter (**4**) for removing the part of a second signal (U_{II}), which has the operating frequency of the network, said second signal being proportional to the voltage at the measuring point, a directional detector (**13**) having first and second pairs of input terminals (**9,10** and 11,12) and first and second output terminals (**14,15**), means to supply a signal from the first filter to one of the first pair of input terminals when the first filtered signal is positive and to the other of the first pair of input terminals when the first signal is negative, means to supply a signal from the second filter to one of the second pair of input terminals when the second filtered signal is positive and to the other of said second pair of input terminals when the second signal is negative, said two filtered signals consisting of those parts of said first and second signals (U_I, U_{II}) which have passed the filters and which for the main part contain only transients, said directional detector including means to supply a signal to the first output terminal when the signals supplied to the terminals of the first and second pairs of input terminals have different signs and to the second output terminal when the signals supplied to the terminals of the first and second pairs of input terminals have the same sign, a tripping relay (**18**) connected to said first output terminal (**14**) for producing a tripping signal when a signal is supplied to said first output terminal, and a blocking relay (**19**) connected to said second output terminal (**15**) for producing a blocking signal when a signal is supplied to said second output terminal.

3,878,461

APPARATUS FOR MEASUREMENT OF THE AMOUNT OF IMPURITY IN A FLUID

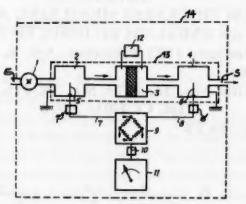
Robert Eugène Saint-André, Limoges, France, assignor to Sofrance, S.A., Limoges, France

Filed July 30, 1970, Ser. No. 59,585

Claims priority, application France, Aug. 4, 1969, 69.26693

Int. Cl. G01r *27/26*

U.S. Cl. 324—61 R **5 Claims**



1. An apparatus for measuring the concentration in a liquid of an impurity the presence of which modifies the dielectric constant of the liquid, comprising a succession of cells including in order, a first measuring cell, a filtration cell and a second measuring cell, each measuring cell comprising a condenser and the apparatus having means for causing the liquid to pass between the condenser plates of the first measuring cell, then across the filtration cell and then between the condenser plates of the second measuring cell, said filtration cell comprising means for retaining the free water which is present in the liquid and which constitutes the impurity which is required to be measured, a comparator device electrically connected to the condensers of the measuring cells, said comparator producing a signal representing the difference between the dielectric constants of the liquid passing through the first measuring cell and of the liquid passing through the second measuring cell, the said signal being transmitted to an apparatus adapted to indicate the value of the signal.

3,878,462

TAUT BAND SUSPENSION SYSTEM WITH STRAIN RELIEF

Edward D. Orth, Boxford; Carl F. Van Bennekom, Lynnfield, both of Mass., and Ronald H. MacPherson, Bloomington, Ill., assignors to General Electric Company, Lynn, Mass.

Filed Dec. 6, 1973, Ser. No. 422,257

Int. Cl. G01r *5/02, 1/00*

U.S. Cl. 324—154 **11 Claims**

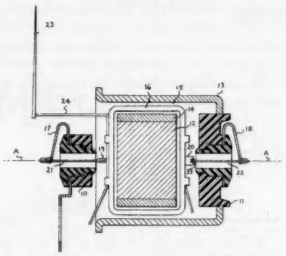
1. A taut band suspension system for supported a rotor of a measuring instrument for rotation relative to a fixed support comprising:

an outer band anchor mounted on said support,

an inner band anchor mounted on said rotor,

a taut band having one end attached to said outer band anchor and the other end attached to said inner band anchor so as to support said rotor for rotation about an axis extending in the direction of the band, and

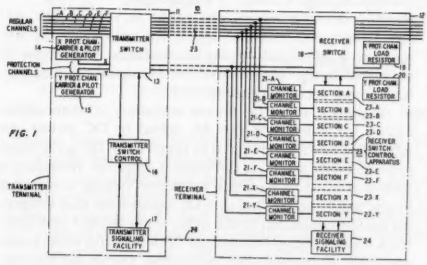
strain relief means for preventing fatigue producing stress of the band in a vibrational environment, said strain relief means comprising a quantity of soft elastic material surrounding and bonded to the taut band in an area of the band adjacent to the point of attachment of the band to the band anchor.



3,878,463
AUTOMATIC CHANNEL SWITCHING SYSTEM

Frederick Harold Lanigan, Lowell, Mass., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 6, 1973, Ser. No. 367,482
Int. Cl. H04b *3/00*
U.S. Cl. 325—2 **22 Claims**



1. Apparatus for initiating the substitution of a protection channel for any one of a plurality of regular channels comprising:

a protection network including a plurality of channel associated circuit segments each of which is associated with a different channel, said segments being connected in series and providing a means for transmitting an enabling signal from segment to segment;

and control means responsive to said enabling signal for initiating the substitution of said protection channel for a failed regular channel.

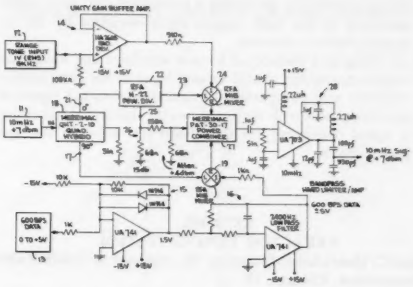
3,878,464
MODULATOR FOR TONE AND BINARY SIGNALS

James C. Fletcher, Administrator of the National Aeronautics & Space Administration with respect to an invention of; James R. McChesney, Tonawanda; Theodore Lerner, Buffalo, and Ernest J. Fitch, Eggertsville, all of N.Y.

Filed June 15, 1973, Ser. No. 370,271
Int. Cl. H04k *1/08;* **H04h** *3/00*
U.S. Cl. 325—30 **11 Claims**

1. A modulator for a sinusoidal tone signal $[f(t)]$ of variable phase and a binary signal comprising means for providing a carrier signal sin $\omega_o t$, and means responsive to the carrier signal, the tone signal and the binary signal for deriving a composite a.c. signal of constant amplitude, constant carrier frequency and a variable phase represented by:

$$\theta(nT) + \phi(t),$$



where:

t = time,

$\theta(nT) = 0$ for a first value of the binary signal,

$\theta(nT) = \pi$ for a second value of the binary signal,

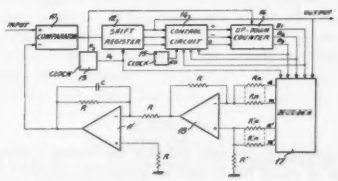
$\tan \phi(t) = A_1 f(t) + A_3/A_2$, and

A_1, A_2 and A_3 are constants having finite, non-zero values.

3,878,465
INSTANTANEOUS ADAPTATIVE DELTA MODULATION SYSTEM

Hubert Stephenne, Rock Forest, Quebec; Pierre A. Deschenes, and Francoise Busigny, both of Sherbrooke, Quebec, all of Canada, assignors to Universiste de Sheerbrooke, Sherbrooke, Quebec, Canada

Filed Dec. 15, 1972, Ser. No. 315,356
Int. Cl. H03k *13/22*
U.S. Cl. 325—38 B **5 Claims**



1. An instantaneous adaptative delta modulator comprising;

a. a comparator having a first and a second input and a single output, said first input being connected to receive an input analog signal;

b. a shift register connected to the output of said comparator for storing the digit generated at sampling time T_0 and the digits generated at sampling times T_{-1} and T_{-2};

c. a binary up and down counter;

d. a control circuit interconnecting said shift register and said up and down counter, said control circuit comprising first gate means and second gate means responsive to a combination of the digits generated at sampling times T_0, T_{-1} and T_{-2} for making the decision as to whether an up count, a down count, or no count is required depending on the digits stored into the shift register and on the actual state of the up and down counter;

e. a logic circuit having a plurality of outputs for selecting and producing a signal on one of said outputs in response to the binary output of said up and down counter, all of said outputs except the selected one being open-circuited;

f. a plurality of resistive elements, each being connected to one output of said plurality of outputs of said logic circuit, said elements weighing the logic circuit output signal;

g. an amplifier connected in series with said plurality of resistive elements and thus responsive to said up and down counter for providing a predetermined gain corresponding to the logic output signal weighed by the selected resistive element;

h. an integrator connected to said amplifier and having an output connected to said second input of the comparator; whereby said comparator compares the output signal of said integrator with the input analog signal and generates a signal depending on the difference between the two input signals.

3,878,466

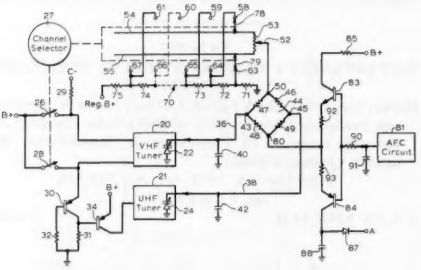
VARACTOR TUNING SYSTEM

Melvin C. Henrickson, Elmhurst, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Feb. 12, 1973, Ser. No. 331,921

Int. Cl. H03j *5/02*

U.S. Cl. 325—464 **3 Claims**



1. A television channel selector for tuning a plurality of channels of equal bandwidth in unequally spaced frequency bands, said channels being contiguous within each individual band comprising:

tuning means including at least one varactor as the frequency-determining element, the frequency determined being a function of the voltage presented to a terminal of said varactor;

a source of DC potential;

a voltage divider connected across said DC source and composed of a plurality of resistors connected successively in series with the junctions between successive resistors terminating in stationary contacts;

fine-tuning means including a potentiometer having a movable tap coupled to said terminal to supply a frequency-determining voltage to said varactor, and a pair of offset movable contacts, each connected to respective opposing ends of said potentiometer;

channel selection means for moving said offset movable contacts sequentially into engagement with adjacent ones of said resistors to adjust the level of said frequency determining voltage; and

means, coupled to said voltage divider, bridging those stationary contact which define adjacent ends of said unequally spaced frequency bands.

3,878,467

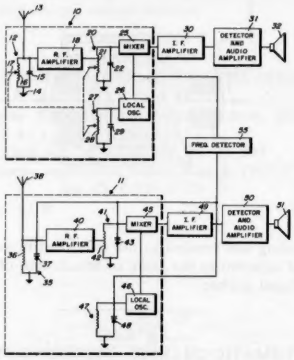
TUNING SYSTEM FOR AM/FM RECEIVERS

Peter St. C. Manson, Barrington, Ill., assignor to Motorola, Inc., Chicago, Ill.

Filed June 6, 1973, Ser. No. 367,610

Int. Cl. H04b *1/06*

U.S. Cl. 325—316 **4 Claims**



1. A tuning system for a wave signal receiver including in combination:

manually tunable oscillator means providing an AC signal tunable through a range of frequencies;

frequency detector means connected to receive the AC signal from said oscillator means for converting the AC signal to a DC signal varying in amplitude in response to variations in the frequency of the AC signal produced by tuning said oscillator means;

said frequency detector means including a monostable circuit for converting the AC signal to DC pulses, an integrator circuit connected to receive the DC pulses and provide a DC signal, a differential amplifier including a pair of transistors having a reference voltage connected to one input thereof and said DC signal from said integrator circuit connected to the other input thereof and feedback circuit means connected between said differential amplifier means and said monostable circuit for increasing the DC pulse width from said monostable circuit in response to AC signals in the high end of the frequency band being connected thereto from said oscillator means;

variable capacitance means connected to the front end of the wave signal receiver for tuning the front end in response to a voltage applied to said variable capacitance means; and

means connecting the DC signal from said differential amplifier means to said variable capacitance means for varying the tuning of the receiver front end in response to manual tuning of said local oscillator means.

3,878,468

JOINT EQUALIZATION AND CARRIER RECOVERY ADAPTATION IN DATA TRANSMISSION SYSTEMS

David Duncan Falconer, Red Bank; Kurt Hugo Mueller, Matawan; Jack Salz, Fair Haven, all of N.J., and David Adams Spaulding, Mountain View, Calif., assignors to Bell Telephone Laboratories, Incorporated, Berkeley Heights, N.J.

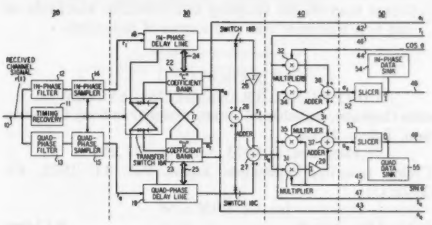
Filed Jan. 30, 1974, Ser. No. 437,978

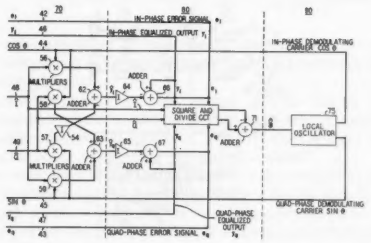
Int. Cl. H04b *1/10*

U.S. Cl. 325—320 **8 Claims**

1. In a data receiver for data signals synchronously modulated onto quadrature phases of a common carrier wave including a transversal equalizer structure having a delay line

with taps located at synchronous intervals therealong for each of the quadrature-related received signals, an adjustable attenuator connected to each tap on each delay line and a corresponding correlator jointly responsive to error and tap signals for determining the adjustment of each attenuator, and combining circuits for forming each of the in-phase and quadrature-phase equalizer outputs; and further including a demodulating carrier-wave source, a demodulator for respective in-phase and quadrature-phase received-signal components, and a data recovery circuit operating on demodulated in-phase and quadrature-phase received signals to derive quantized baseband data signals: the improvement comprising





means for forming in-phase and quadraturephase error signals from the differences between respective in-phase and quadrature-phase outputs of said equalizer and said data recovery circuit,

means responsive to said in-phase and quadrature-phase error signals for generating control signals for said adjustable attenuators on each of said delay lines,

means for cross-multiplying respective in-phase and quadrature-phase error signals from said generating means with the quadrature-phase and in-phase equalizer outputs to form cross-product signals, and

means responsive to the differences between said cross-product signals from said cross-multiplying means for deriving control signals for the frequency and phase of the output of said demodulating carrier-wave source.--.

3,878,469

METHOD AND APPARATUS FOR PRODUCING IONS AT ULTRASONIC FREQUENCIES

Robert E. Bolasny, Boulder, Colo., assignor to Scientific Enterprises, Inc., Bloomfield, Colo.

Continuation-in-part of Ser. No. 266,592, June 27, 1972. This application July 23, 1973, Ser. No. 381,601

Int. Cl. B05b *3/14, 5/02*

U.S. Cl. 328—233 **27 Claims**

1. In a method of producing ions in a gas with greater efficiency and a minimum of ozone, the steps of:

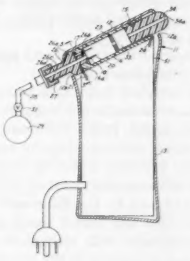
providing a stream of gas,

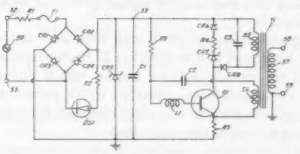
applying periodic pulses of electric energy to the stream of gas to generate ions, and

pulsing the stream of gas with ultrasonic sound wave vibrations which are approximate multiples of the frequency of the electric energy to produce groups of the ions in distinct pressure fronts at higher energy levels to increase the energy level thereof.

14. In apparatus for producing ions in a gas with greater efficiency and a minimum of ozone, the combination comprising:

means for providing a stream of gas under pressure,





ion generator and dispersing means for applying periodic pulses of electric energy to the stream of gas to produce ions, and

sound wave generator means for pulsing the stream of gas with ultrasonic sound wave vibrations which are approximately multiples of the frequency of the electric energy to generate groups of ions in the stream of gas in distinct pressure fronts at higher energy levels to increase the energy level thereof.

3,878,470

FM DEMODULATOR

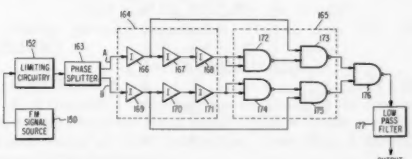
Charles D. Boltz, Jr., Greenwood, Ind., assignor to RCA Corporation, New York, N.Y.

Filed July 16, 1973, Ser. No. 379,469

Claims priority, application United Kingdom, Aug. 18, 1973, 38708/73

Int. Cl. H03d *3/04*

U.S. Cl. 329—126 **7 Claims**



1. Apparatus for demodulating a frequency modulated signal comprising:

a source of frequency modulated signals having first and second signal output terminals providing first and second signals of opposite phase,

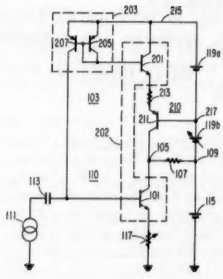
a first signal processing channel comprising:
a first coincidence detector;
a first signal path coupled from said first signal terminal to said first coincidence detector;
a second signal path coupled from said first signal terminal to said first coincidence detector;
said first and second signal paths exhibiting unequal signal time delay characteristics whereby said first coincidence detector provides a first output signal which is a series of substantially constant width pulses having a width determined by the difference in signal delay between said first and second signal paths; and
a second signal processing channel comprising:
a second coincidence detector;
a third signal path coupled from said second signal terminal to said second coincidence detector;
a fourth signal path coupled from said second signal terminal to said second coincidence detector;
said third and fourth signal paths exhibiting unequal signal time delay characteristics whereby said second coincidence detector provides a second output signal which is a series of substantially constant width pulses having a width determined by the difference in signal delay between said third and fourth signal paths, and occurring in timed relation with respect to pulses of said first output signal according to the relative phases of said first and second signals provided by said source of signals;
summing means coupled to said first and second coincidence detectors and responsive to their respective output signals to provide a third output signal consisting of a series of substantially constant width pulses, the repetition rate of which is a multiple of said frequency modulated signal repetition rate; and
low pass filter means coupled to said summing means and responsive to said third output for recovering the signal modulation represented by the summation of said first and second series of substantially constant width pulses.

3,878,471

STABILIZATION OF QUIESCENT COLLECTOR POTENTIAL OF CURRENT-MODE BIASED TRANSISTORS

Adel Abdel Aziz Ahmed, Annandale, N.J., assignor to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 302,866, Nov. 1, 1972, abandoned. This application Apr. 5, 1974, Ser. No. 458,186
Int. Cl. H03f *3/04*
U.S. Cl. 330—40 **13 Claims**



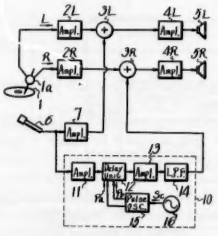
1. Biasing arrangement for a first transistor having collector, emitter and base electrodes and being capable of providing collector current to base current gain, said biasing arrangement comprising:
a source of potentials including a reference potential;
a current supply with first and second terminals respectively providing first and second currents;
means included with said current supply and responsive to the absolute temperature of said first transistor for maintaining the ratio of said second current to said first current substantially equal to the ratio of said collector current to base current gain of said first transistor;
means to impress said first current on said base electrode of said first transistor;
means to impress said second current on said collector electrode of said first transistor;
means to couple said emitter electrode of said first transistor to said reference potential and
collector load means coupling said collector electrode of said first transistor and said source of potentials.

3,878,472

AUDIO SIGNAL TRANSMITTING SYSTEM

Yoshio Osakabe, Yokohama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Dec. 3, 1973, Ser. No. 421,215
Claims priority, application Japan, Dec. 11, 1972, 47-142222[U]
Int. Cl. H03f *3/68*
U.S. Cl. 330—124 R **9 Claims**



6. An audio transmitting system comprising, a first source of audio signals, a vibrato device receiving the output of said source of audio signals, said vibrato device comprising a variable time delay device having an input terminal receiving said audio signals, an output terminal, and at least one time delay control terminal, a pulse oscillator connected to said time control terminal to vary the time delay of said variable time delay device, a low frequency oscillator connected to said pulse oscillator to vary the pulse frequency thereof, a second audio frequency source having left and right stereo components, a first mixer receiving one of said left and right stereo components of said second audio source and the output of said variable time delay device, a first audio reproducing means connected to said first mixer, a second mixer receiving the other one of said left and right stereo components of said second audio source and the output of said variable time delay device, and a second audio reproducing means connected to said second mixer.

3,878,473

DIGITAL PHASE-LOCKED LOOP GENERATING SIGNED PHASE VALUES AT ZERO CROSSINGS

Ralph W. Furtney, Jr., Boulder, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 17, 1974, Ser. No. 480,073
Int. Cl. H03b *3/04*
U.S. Cl. 331—1 A **11 Claims**

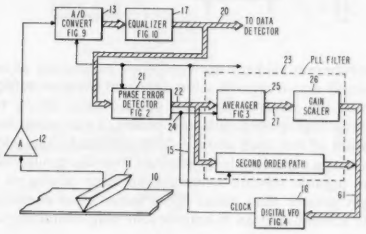
1. A digital phase locked loop for operation with apparatus processing a periodic signal having a period T, the improvement including in combination:
timed means quantizing amplitudes and indicating polarity sign of said periodic signal substantially at zero crossings

and at midpoints between said zero crossings and supplying a set of amplitude indicating digital signals for each said quantized amplitudes,

first shift register means receiving said amplitude indicating digital signals for storing a plurality of said sets of said digital signals,

means connected to said quantizing means for receiving sign signals, determining sign changes in said amplitudes and supplying a digital signal indication of said sign change,

second shift register means receiving said sign change digital signal synchronously with said first shift register means receipt of said amplitude digital signals,



means responsive to said second shift register means for detecting a change of sign and supplying a change of sign digital signal,

means responsive to said change of sign change digital signal to gate a certain one of said sets of amplitude indicating digital signals in said first shift register means as a phase error value set of digital signals,

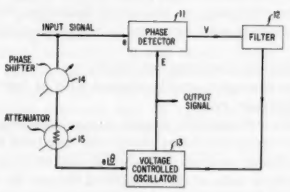
means scaling said set of phase error value indicating signals to supply a set of frequency control digital signals, and

clock means responsive to said frequency control digital signals to supply clock signals at a successive half periods of T to time said quantizing means.

3,878,474
PHASE LOCKED LOOP

Peter Klaus Runge, Fair Haven, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 17, 1974, Ser. No. 479,604
Int. Cl. H03b *3/06*
U.S. Cl. 331—10 **3 Claims**



1. A phase locked loop including:

a phase detector for generating an error signal;

a voltage controlled oscillator whose frequency is varied by said error signal;

means for coupling said error signal to said oscillator;

means for coupling said oscillator to said phase detector;

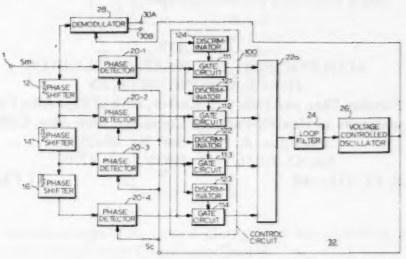
means for coupling an input signal to said phase detector; and means for injecting a component of said input signal into said voltage controlled oscillator; CHARACTERIZED IN THAT:

the phase angle, θ, of the component of input signal injected into said oscillator, relative to the phase of the oscillator signal at the point of injection, is substantially different than zero in order to significantly reduce the jitter bandwidth of the said phase locked loop.

3,878,475
SYSTEM FOR REPRODUCING CARRIER WAVE FOR N DIFFERENTIAL PHASE SHIFT KEYED MODULATED WAVE

Akira Okano; Yoichi Moritani, and Masahiro Murakami, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 28, 1973, Ser. No. 429,294
Claims priority, application Japan, Dec. 28, 1972, 48-1475
Int. Cl. H03b *3/06*
U.S. Cl. 331—12 **6 Claims**



1. A system for reproducing a carrier wave for an n differential phase shift keyed modulated signal, where n is an integer having a value of at least two(2), comprising, in combination, n phase detectors for phase detecting said n differential phase shift keyed, modulated signal, an $(m+1)$th one of said phase detector detecting said n differential phase shift keyed, modulated signal with an axis of phase detection of $2\pi(m-1)\pi/n$ where m is an integer satisfying the relationship n m 1, and a control circuit for controlling the passage of an detected output from each of said phase detectors therethrough so that, when the detected output from the mth phase detector is under a predetermined threshold level, that phase detector having the axis of phase detection adjacent to that of the mth phase detector has its detected output passed through said control circuit.

3,878,476
HETERODYNING CIRCUIT FOR CHANGING FREQUENCIES OF RECEIVED SIGNAL

Etienne Augustin Henri Honore, Chatenay Malabry, France; Emile Leon Gabriel Torcheux, deceased, late of Chatenay Malabry, France; Micheline Marie Torcheux, born Deloffre, Paris, France; Alain Torcheux, Paris, France, and Adeline Garet, born Torcheaux, heirs, Paris, France, assignors to Societe d'Etude et d'Application des Techniques Nouvelles Neo-Tec

Filed June 29, 1973, Ser. No. 374,857
Claims priority, application France, July 27, 1972, 72.27060
Int. Cl. H03b *21/02*
U.S. Cl. 331—38 **15 Claims**

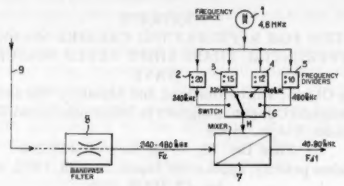
1. A frequency changing stage for changing the frequency of a high frequency input signal which is within a predetermined range of high frequencies, comprising a frequency source of high stability,

frequency dividers coupled to said source and capable of furnishing a plurality of successive multiples of a predetermined frequency f, associated with the frequency changing stage,

a mixer circuit capable of mixing the input signal with a heterodyne signal, and

switch means for selectively connecting one of the succes-

sive multiples of the frequency f as a heterodyne signal to the mixer circuit, the selected heterodyne signal being of



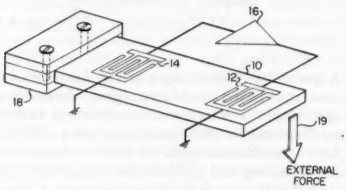
such frequency that the output signal of the mixer circuit has a frequency between *f*/2 and *f*.

3,878,477

ACOUSTIC SURFACE WAVE OSCILLATOR FORCE-SENSING DEVICES

J. Fleming Dias, and Henry E. Karrer, both of Palo Alto, Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jan. 8, 1974, Ser. No. 404,829
Int. Cl. G01b *7/16*; **H03b** *5/32*, *21/00*
U.S. Cl. 331—40 **11 Claims**



1. A dual acoustic surface wave oscillator comprising:

a substrate of piezoelectric material having a first surface and a second surface;

two transducers disposed a predetermined distance apart on the first surface of the piezoelectric material forming a first transducer set for propagating a first acoustic surface wave thereon;

two transducers disposed a predetermined distance apart on the second surface of the piezoelectric material forming a second transducer set for propagating a second acoustic surface wave thereon;

a first amplifier connected to the first transducer set forming a first acoustic surface wave oscillator having an output terminal for coupling the output signal therefrom; a second amplifier connected to the second transducer set forming a second acoustic surface wave oscillator having an output terminal for coupling the output signal therefrom; and

mixing means, connected to the output terminals of the first and second acoustic surface wave oscillators, for combining the output signals therefrom to form a resultant output signal having a frequency representing the difference in the frequency of the first and second acoustic surface wave oscillators.

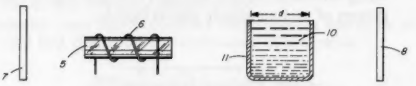
3,878,478

MODE-LOCKING GIANT PULSE LASERS

Karl H. Drexhage, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed July 25, 1973, Ser. No. 382,416
Int. Cl. H01s *3/10*
U.S. Cl. 331—94.5 ML **8 Claims**

1. In a laser apparatus for generating a train of discrete, high-power, short, monochromatic infrared light pulses including an optical cavity, lasing means positioned within said cavity for the production of radiative infrared emission during population inversion thereof, a pumping energy source operably coupled to said lasing means for stimulating the population inversion thereof, and as a light control means a saturable absorption media having an absorption peak within the range of from about 700 nm to about 2500 nm and comprising a transition metal dithiene complex dissolved in a solvent for said complex, said light control means adapted to be positioned within said cavity to control said emission, the improvement wherein said solvent comprises an amount of an electronically active organic solvent for said complex sufficient to convert the infrared emission of said laser into a train of discrete, high-power, infrared pulses, each pulse having a duration of less than about 0.5 nanoseconds, said electronically active organic solvent selected from the group consisting of an organic solvent containing an atom having an atomic weight greater than about 50, a sulfur atom-containing organic solvent, and an N-heterocyclic ring-containing organic solvent.

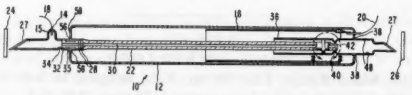


3,878,479

MEANS FOR REGULATING VAPOR PRESSURE IN A METAL-VAPOR LASER

Steven James Heising, San Jose, and Mark W. Dowley, Palo Alto, both of Calif., assignors to Coherent Radiation, Palo Alto, Calif.

Filed Apr. 27, 1973, Ser. No. 355,155
Int. Cl. H01s *3/22*
U.S. Cl. 331—94.5 T **3 Claims**



1. A laser having as part of its lasing medium a normally non-gaseous constituent which is in the vapor state during the operation of the laser, comprising:

means for providing an electrical discharge through said lasing medium said means including an anode and a cathode;

a bore tube for confining said discharge;

an optical resonator axially aligned with at least a part of said discharge path;

a generally cylindrically-shaped vapor-confining discharge tube envelope extending along said bore tube and enclosing the lasing medium and wherein said envelope is sealed to said bore tube at the anode end thereof by means of a transversely-situated cap member;

means for housing the non-gaseous constituent near the anode end of said bore tube and in proximity with at least a part of said discharge so that said non-gaseous constituent is continuously being vaporized by the heat generated therefrom; and

means for utilizing the geometry of said envelope for automatically regulating the vapor pressure within said envelope of said normally non-gaseous constituent during laser operation by controlling the temperature of said normally non-gaseous constituent; and

said geometric utilization means comprising means for positioning said capped end of said cylindrical envelope at a location with respect to said bore tube and said

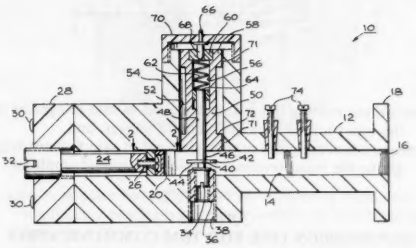
normally non-gaseous constituent whereby the desired rate of heat dissipation from said constituent is provided.

3,878,480

MILLIMETER WAVE OSCILLATOR WITH A CAVITY RESONATOR

Garry N. Hulderman, Riverside; Leon J. Lader, Los Angeles, and Jay B. Winderman, Claremont, all of Calif., assignors to General Dynamics Corporation, Pomona, Calif.

Filed Sept. 24, 1973, Ser. No. 400,081
Int. Cl. H03b *7/14*
U.S. Cl. 331—96 **10 Claims**



1. A millimeter wave oscillator for generating a wave output to be applied to a following circuit comprising:

an oscillator case of substantially block construction and defining a longitudinally disposed waveguide passageway open at one end for coupling to said following circuit;

closure means disposed in said passageway to close off the other end thereof;

semiconductor holder means adjustably disposed in said case for orthogonal movement relative to the longitudinal axis of said waveguide passageway;

semiconductor means secured in said holder means, said semiconductor means having at least two electrodes, one of which terminates at a terminal on the exterior of said semiconductor means;

disc means having one face coupled to said terminal and disposed for movement with said semiconductor means for matching the impedances of the semiconductor means and the waveguide passageway for various positions of said semiconductor means;

piston means movably disposed in said case substantially opposite said holder means, the other face of said disc means being coupled adjacent one end of said piston means, whereby said piston means is adapted for a movement along an axis thereof in following relationship with adjustment movement of said holder means; and

resilient biasing means disposed in said case for urging said piston means toward said holder means to maintain direct contact by said one face of said disc means with said terminal of said semiconductor means.

3,878,481

LOW NOISE VHF OSCILLATOR WITH CIRCUIT MATCHING TRANSISTORS

Daniel J. Healey, III, Baltimore, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 2, 1973, Ser. No. 412,515
Int. Cl. H03b *1/04, 5/36*
U.S. Cl. 331—105 **12 Claims**

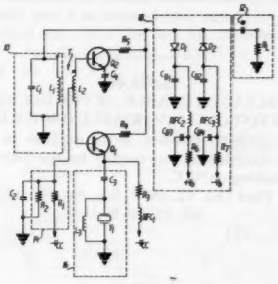
4. An oscillator circuit for generating a low noise, high frequency output signal, said oscillator compising:

a. amplifier transistor means having a first input terminal for determining its output derived from second and third terminals thereof, said amplifier means presenting a variable capacitance characteristic between its first and second terminals;

b. compensation transistor means having a variable capacitance characteristic between its first and second terminals substantially identical to that of said amplifier means, and a third terminal;

c. first resonant circuit resonating at a frequency within a prescribed frequency range, said first resonant circuit coupled to said second terminals of said amplifier means and said compensation means;

d. isolation means coupled to said third terminal of said compensation transistor means for providing a low A.C.



impedance path to circuit ground and for providing an open circuit to D.C. currents; and

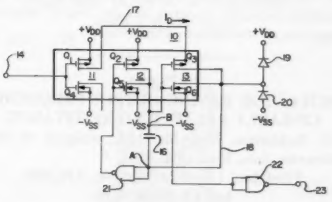
e. means for coupling energy from said first resonant circuit to said amplifier means so that sustained, free oscillation is established in said first resonant circuit, said coupling means applying signals of sustantially equal amplitude but opposite phase to said first terminals of said amplifier means and said compensation means, whereby the dynamic variable capacitance of said compensation means is coupled effectively in a feedback circuit established through said coupling means to said amplifier means.

3,878,482

WIDE-BAND, VOLTAGE CONTROLLED OSCILLATOR UTILIZING COMPLIMENTARY METAL OXIDE SEMICONDUCTOR INTEGRATED CIRCUITS AND A CONSTANT CURRENT MOS-FET FIELD EFFECT TRANSISTOR

Lester F. Schowe, Jr., Endwell, N.Y., assignor to General Electric Company, Binghamton, N.Y.

Filed Oct. 4, 1973, Ser. No. 403,472
Int. Cl. H03k *3/282*
U.S. Cl. 331—108 D **8 Claims**



1. A voltage controlled oscillator comprising:

a. a voltage controlled constant current source including a Complementary Metal Oxide Semiconductor element;

b. an input terminal coupled to said constant current source adapted to receive an input voltage to vary the current level from said source as a function of the input voltage.

c. a storage element;

d. means including a Complementary Metal Oxide Semiconductor FET pair coupled between said constant current source and said storage element for alternately estab-

lishing a charging and discharging path for said storage element one of said FET elements connecting the storage element to said constant current source to charge said capacitor from said source and the other FET of said pair rapidly discharging said capacitor through said FET to a point other than the constant current source.

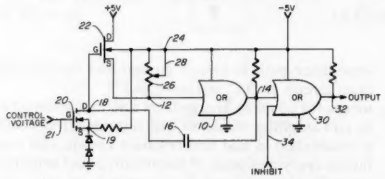
e. semiconductor switching means having an input coupled to said storage element and an output coupled to said means for establishing a charging and discharging path, said switching means being actuated in response to the voltage level on said storage element to connect said storage element intermittently to said constant current source to charge said element at a rate proportional to said current.

3,878,483

VOLTAGE-TUNABLE, SEVEN-DECADE, CONTINUOUSLY-VARIABLE OSCILLATOR

Kay R. Richardson, Phoenix, Ariz., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 12, 1973, Ser. No. 406,123
Int. Cl. H03k *3/02*
U.S. Cl. 331—111 **8 Claims**



1. A voltage-tunable oscillator continuously tunable over seven decades comprising:

a digital-logic-gate circuit having an input and an output, said output being the oscillator output;

a voltage-controlled, variable-impedance circuit having a control-voltage input and an output;

positive feedback means connected between said digital-logic-gate output and said variable-impedance circuit output;

a field-effect circuit having an input and an output, said input being connected to said variable impedance circuit output, said output being connected to said digital logic gate input, said field effect circuit only setting the operating point of said digital-logic-gate circuit while said oscillator output is varied over seven decades;

a variable, control voltage; and

means for applying said control voltage to said variable-impedance-circuit control-voltage input whereby the frequency of oscillation is controlled.

3,878,484

OSCILLATOR HAVING OUTPUT FREQUENCY LINEARLY RELATED TO RESISTANCE

Norris C. Hekimian, Rockville, Md., assignor to Hekimian Laboratories, Inc., Rockville, Md.

Filed Jan. 11, 1974, Ser. No. 432,458
Int. Cl. H03k *4/56*
U.S. Cl. 331—143 **14 Claims**

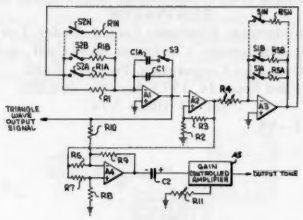
13. An oscillator having a frequency which is variable over a known frequency range, said oscillator comprising:

an integrator having an input terminal and an output terminal;

a Schmitt trigger circuit having an input terminal and an output terminal;

an operatinal amplifier having an input terminal and an output terminal, said operational amplifier including a resistive negative feedback path and means for controllably varying the gain of said operational amplifier by selectively varying the resistance of said negative feedback path;

means connecting the output terminal of said operational amplifier to the input terminal of said integrator;



means connecting the output terminal of said integrator to the input terminal of said Schmitt trigger; and

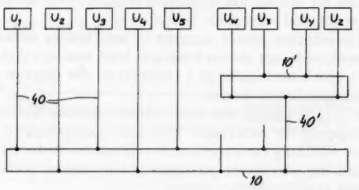
means connecting the output terminal of said Schmitt trigger to the input terminal of said operational amplifier.

3,878,485

TRANSMISSION LINE FOR TDM COMMUNICATION SYSTEM

Paolo Erculiani, Milan, Italy, assignor to Societa Italiana Telecommunicazioni Siemens S.p.A., Milan, Italy

Filed June 13, 1973, Ser. No. 369,731
Claims priority, application Italy, June 15, 1972, 25734/72; June 15, 1972, 25735/72; June 15, 1972, 25733/72
Int. Cl. H04h *3/10*; **H04b** *3/28*
U.S. Cl. 333—6 **7 Claims**



1. A transmission line for a time-division-multiplex communication system, comprising elongate first conductor means, elongate second conductor means spacedly juxtaposed with said first conductor means, and insulating means of a substantially nonpolarizable dielectric material, the effective thickness of said first and second conductor means in a common transverse plane being at most on the order of magnitude of the penetration depth of an alternating current at a frequency in the KHz range, said conductor means forming a closed loop with a multiplicity of junctions to respective branch lines at spaced-apart locations, said loop forming two parallel paths between any two of said junctions.

3,878,486

HIGH FREQUENCY DEVICE ASSEMBLY

Raymond Harkless Dean, Lawrenceville, N.J., assignor to RCA Corporation, New York, N.Y.

Filed July 11, 1973, Ser. No. 378,269
Int. Cl. H01p *3/08, 5/08, 1/16*
U.S. Cl. 333—24 R **4 Claims**

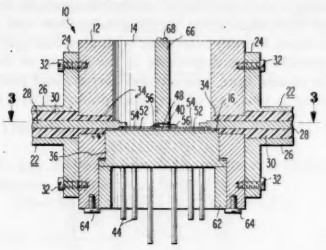
1. A high frequency device assembly comprising

a housing having a passage therethrough,

a base plate mounted in and extending across the passage in the housing,

a high frequency device mounted on said base plate within said passage,

at least one terminal extending through said base plate and electrically connected to said high frequency device, and at least one coaxial terminal mounted on said housing, said coaxial terminal having a conductor pin extending through said housing to said passage and electrically connected to said high frequency device,



said base plate having a metal rib projecting from and extending diametrically across its surface on which the high frequency device is mounted, said rib having a notch thereacross,

said high frequency device being mounted within the notch and a pair of microstrip circuit plates being mounted on the base plate on opposite sides of the rib, each of said microstrip circuit plates including a metal film strip electrically connected to the high frequency device and to a separate coaxial terminal pin.

3,878,487

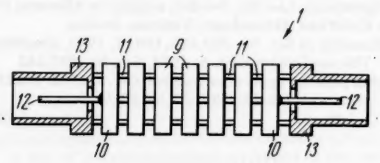
ELECTROMECHANICAL DISC FILTER

Alexandr Lvovich Irzhavsky, Otkrytoe schosse, 3, korpus 1, kv. 31; Petr Samuilovich Stolyar, ulitsa Petrozavodskaya 17, korpus 1, kv. 102, and Konstantin Alexandrovich Shulgin, ulitsa Bolhaya Mariinskaya 10, kv. 53, all of Moscow, U.S.S.R.

Filed Aug. 2, 1973, Ser. No. 384,977

Int. Cl. H03h *9/02, 9/04, 9/30*

U.S. Cl. 333—71 **8 Claims**



1. An electromechanical disc filter comprising: an input electromechanical transducer; a plurality of disc resonators arranged parallel to one another in spaced relationship and operable in a bending oscillation mode with nodal circles, said plurality including at least one intermediate disc resonator and a pair of terminal disc resonators; longitudinally extending mechanical links interconnecting said disc resonators, said mechanical links being attached to the face surfaces of the respective ones of said disc resonators at points along a circle having a diameter equal to the diameter of a nodal circle of said disc resonator; support elements for mounting said terminal disc resonators; an output electromechanical transducer said disc resonators being arranged in a stepwise fashion; those of said mechanical links that are associated with each said intermediate disc resonator being attached to but one face surface thereof, said mechanical links being situated to one side of said intermediate disc resonator; each said terminal disc resonator having said mechanical links attached to both face surfaces thereof, said last-mentioned mechanical links at one side of said terminal disc resonator connecting it with the adjacent one of said intermediate disc resonators and at the other side thereof connecting it to the respective one of said support elements.

3,878,488

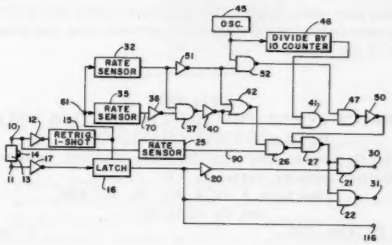
DIGITAL NON-LINEAR FREQUENCY CONTROL

Wayne T. Blythe, Wake Forrest, N.C., and Albert J. Micheizler, Ellicott City, Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 30, 1974, Ser. No. 465,466

Int. Cl. H03j *1/06;* **H03k** *1/16*

U.S. Cl. 334—39 **8 Claims**



1. A frequency control apparatus for effecting fine/coarse tuning by means of a single tuning knob, comprising:

means for providing a first pulse train whose rate is proportional to the rate of rotation of the tuning knob;

means for comparing the rate of the first pulse train with a predetermined rate;

means for providing a second pulse train, the second pulse train having a rate greater than the predetermined rate; a tuning apparatus; and

means for switching to the tuning apparatus the first pulse train if the rate of the first pules train is less than the predetermined rate, and the second pulse train if the first pulse train is greater than the predetermined rate.

3,878,489

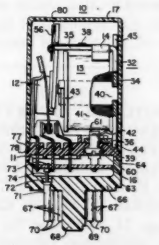
ELECTROMAGNETIC RELAY HAVING A PRINTED CIRCUIT BOARD CONNECTION BETWEEN THE CONTACTS AND RADIO TYPE PLUG-IN CONNECTOR

Richard C. Rothweiler, Asheville, N.C., assignor to Square D Company, Park Ridge, Ill.

Filed Mar. 28, 1974, Ser. No. 455,772

Int. Cl. H01h *50/14*

U.S. Cl. 335—199 **10 Claims**



1. An electromagnetic relay comprising: an insulating base, a plurality of contacts supported by the base with each of the contacts including a contact portion located forwardly of a front side of the base, a terminal portion extending rearwardly

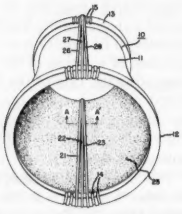
from a rear side of the base and a portion extending through the base interconnecting the contact portion and terminal portion, a radio type plug-in pin connector including an insulating part having a front side positioned adjacent the rear side of the base, an internal cavity extending from the rear side of the base to a rear wall of the part and a plurality of tubular pins with each pin including a portion extending rearwardly from the rear wall and open end exposed to the cavity, and a printed circuit board assembly positioned in the cavity, said assembly including a printed circuit board having openings extending therethrough equal in number to the sum of the pins and terminal portions with half of said openings receiving a terminal end of the terminal portions, a pin in each of the remaining openings in the board with each of the pins having an end portion secured in its associated opening and a portion extending rearwardly from a rear side of the board telescopically received in and electrically connected to one of the tubular pins, and a printed circuit pattern on the board electrically interconnecting the terminal portions with the secured ends of the pins.

3,878,490

DIRECT-WOUND, PRECISION DEFLECTION YOKE WITH ADHESIVE COATED CORE

James H. Logan, Baldwinsville, N.Y., assignor to General Electric Company, Syracuse, N.Y.

Filed Sept. 3, 1974, Ser. No. 502,689
Int. Cl. H01f *7/00*
U.S. Cl. 335—210 **8 Claims**



1. A direct-wound, precision deflection yoke for a cathode ray tube, comprising:

a magnetic core of flared configuration adapted to fit about a portion of a cathode ray tube;

a coating of pressure-sensitive adhesive on the inner surface of said core;

a first layer of coil turn segments wound atop said coating of adhesive such that said turn segments are restrained against sideward movement; and

a second layer of coil turn segments wound over said first layer of coil turn segments, each turn segment of said second layer being located above and bearing against a pair of adjacent turn segments of said first layer at least over a portion of the length of said core.

3,878,491

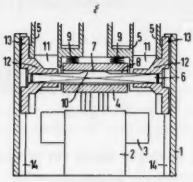
ELECTRICAL SWITCHING APPARATUS HAVING THE ARMATURE AND CONTACT BRIDGE CARRIER FLEXIBLY COUPLED TOGETHER

Gunther Rauter; Gunther Bohlke, both of Amberg, and Gunther Weissberger, Riedenburg, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Aug. 24, 1972, Ser. No. 283,426
Claims priority, application Germany, Aug. 25, 1971, 2142464
Int. Cl. H01f *7/08*
U.S. Cl. 335—270 **12 Claims**

1. In a switch gear apparatus having an armature, means to apply force to move the armature in one direction, a contact bridge carrier mounted for motion in the one direction in a guide means, and being flexibly connected to the armature, the improvement comprising:

means to selectively prevent relative flexing between the armature and carrier when the force of the armature thereon is below a predetermined value and to permit such flexing when said force exceeds said predetermined value, said armature having a bore therethrough, and said means for preventing flexing comprising an elongated pin having a cross-section of smaller dimensions than that of said bore, and having length greater than said bore, said pin being thereby insertable with play through said bore, a protuberance disposable in the region of the interior side of said bore nearest said carrier, said protuberance having a plurality of coplanar points at its extremities,



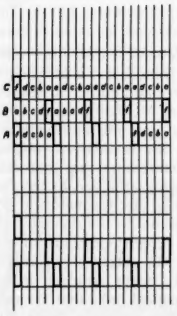
means for connecting the ends of said pin to said carrier when said pin is inserted into said bore with its ends protruding therefrom, and bias means interposed between said carrier and said armature to resiliently apply force to said armature and carrier to force said armature and carrier apart, whereby, when said pin is inserted through said bore and its ends connected to said carrier, said armature and carrier are prevented from flexing when armature force is insufficient to overcome said bias means, by means of said armature bore and pin bearing on said protuberance, and said armature and carrier are permitted to flex relatively only when the force of said armature on said carrier is sufficient to overcome the force of said bias means, and release the pressure on said protuberance.

3,878,492

LIQUID-COOLED TRANSFORMER WINDING

Ove Tjernsteom, Luovika, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Continuation of Ser. No. 403,491, Oct. 4, 1973, abandoned. This application Sept. 5, 1974, Ser. No. 503,442
Claims priority, application Sweden, Oct. 5, 1972, 12825/72
Int. Cl. H01f *27/10, 27/28*
U.S. Cl. 336—62 **1 Claim**



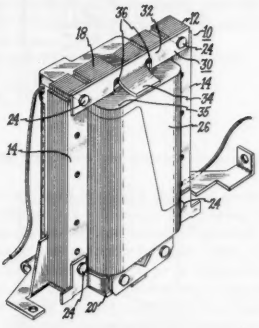
1. Liquid-cooled transformer winding of the disc type, in which a plurality of adjacent discs are each formed of a plural-

ity of parallel conductor parts of the same cross-sectional width wound spirally in a plurality of turns, a majority of said conductor parts being solid, at least one of the conductor parts being hollow and comprising a tube for a cooling medium, said tube forming at least a portion of the innermost coil of a first of said discs, being transposed at the outside of the winding to form at least a portion of the outer coil of the second adjacent disc and being further transposed at the inside of such second, adjacent disc to form at least a portion of the inner coil of the third, next adjacent disc, said tube portions having openings thereinto for ingress and egress of cooling fluid from outside the winding.

3,878,493
INDUCTION WATTHOUR METER POTENTIAL COIL MOUNTING

James J. Grady, Somersworth, N.H., assignor to General Electric Company, Schenectady, N.Y.

Filed June 24, 1974, Ser. No. 482,224
Int. Cl. H01f *27/30*
U.S. Cl. 336—197 **4 Claims**



1. An induction watthour meter electromagnet assembly of the type including;

a ferromagnetic core piece having a central winding leg and a pair of parallel outer legs, all joined at one end by a yoke having side faces, said central winding leg having a flux pole at its other end and the other ends of said outer legs forming air gaps with said flux pole,

a pole piece mounted on the other end of said central winding leg and extending under said flux pole,

a potential coil having top and bottom faces mounted on said central winding leg,

a rigid stop for preventing movement of said bottom face of said coil along said winding leg toward said air gaps, and a spring contacting the top face of said coil to resiliently force said bottom face against said stop, wherein the improvement comprises said spring, comprising:

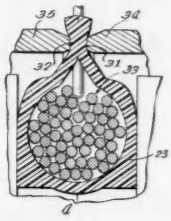
a flat, elongated metal sheet base portion rigidly held at its ends against one side face of said yoke member, and

a tongue portion extending generally toward the top face of said potential coil from said base portion and curving outward from the general plane of said base portion, the outer portion of said tongue resiliently pressing on said top face of said coil in cantilever fashion.

3,878,494
COIL ASSEMBLY

Hashem M. Gharaibeh, Palatine, Ill., assignor to Warwick Electronics Inc., Chicago, Ill.

Division of Ser. No. 241,531, April 6, 1972. This application June 20, 1974, Ser. No. 481,350
Int. Cl. H01f *27/30*
U.S. Cl. 336—208 **9 Claims**



1. A coil assembly comprising:

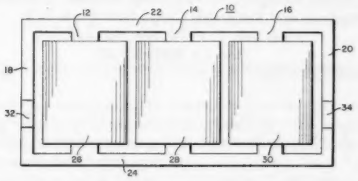
a bobbin comprising a discontinuous annulus having a radially inner wall, and side walls extending radially outwardly from the axially opposite ends of said inner wall and defining therewith a coil space having a gap defined by the discontinuity of the bobbin annulus; and

a continuously annular wound wire coil coaxially in said bobbin coil space bridging said bobbin gap and having connection portions for making electrical connections to said coil, said bobbin enclosing said coil substantially the entire annular length of the bobbin and being provided with an opening intermediate its ends, a first one of said connection portions extending outwardly through said gap and a second of said connection portions extending outwardly through said opening.

3,878,495
MAGNETIC CORE FOR ELECTRICAL INDUCTIVE APPARATUS

Michael W. Thomas, Muncie, Ind., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 2, 1974, Ser. No. 485,466
Int. Cl. H01f *27/24*
U.S. Cl. 336—212 **6 Claims**



1. A magnetic core comprising:

at least first and second laminated inner core legs suitable for the placement of windings there-around;

first and second laminated outer core legs; and

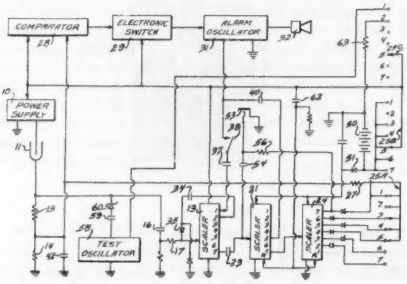
first and second laminated cores yokes which magnetically connect together the inner core legs and the outer core legs;

said first and second laminated outer core legs respectively providing first and second magnetic paths with the core yokes, with said first and second paths each containing a first group of laminations having a first predetermined permeability and a second group of laminations having a second and different permeability.

3,878,496
SELECTABLE LEVEL ALARMING PERSONAL DOSIMETER

Gerlad L. Erickson, Rictiland, Wash., assignor to The United States of America as represented by the Administrator of the Energy Research and Development Administration, Washington, D.C.

Filed June 14, 1971, Ser. No. 152,836
Int. Cl. G01t *1/16*
U.S. Cl. 250—336 **15 Claims**



1. A selectable level dosimeter for monitoring ambient radiation, comprising, radiation detection means for producing pulses in response to the ambient radiation, counting means for counting said pulses and including a plurality of input stages serially coupled to said radiation detection means, a plurality of output stages and a plurality of serially connected intermediate stages coupling said input stages to said plurality of output stages, said output stages being coupled in series whereby a progressively higher number of said input pulses is required to activate consecutive ones of said output stages, alarm means, control switch means for selectively coupling desired ones of said output stages to said alarm means, said alarm means being responsive to an activated one of said output stages coupled thereto to develop an audible alarm.

3,878,497
FUSE LINK ASSEMBLY SUITABLE FOR USE IN AUTOMOTIVE ELECTRICAL SYSTEM

Paul Joseph Spangler, Novelty, Ohio, assignor to International Telephone and Telegraph Corp., New York, N.Y.

Filed Feb. 7, 1974, Ser. No. 440,349
Int. Cl. H01h *85/08*
U.S. Cl. 337—295 **6 Claims**

1. A fuse link assembly for fusing a conductor, said assembly comprising, in combination:

a substantially rigid unitary metallic fuse link member having a reduced cross section at a given generally central integral portion thereof which melts in response to a given current level in said conductor, said fuse link member having structural means at said given portion formed from the meltable material of said fuse link member for increasing the structural strength of said fuse link member, wherein said structural means comprises at least one turned portion extending through said reduced cross section and projecting away from at least one plane of said fuse link member thereby to resist bending or kinking of said fuse link member at said given portion, and said fuse link member having first and second integral terminal portions respectively at opposite ends thereof;

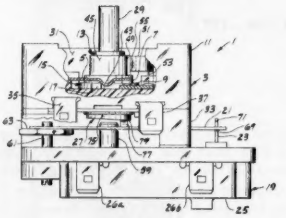
first and second cooperating terminals each cooperating terminal having means for gripping a bare wire and each cooperating terminal slidably engaging one of said first and second terminal portions of said fuse link member; and,

an insulating housing enclosing said assembly.

3,878,498
THERMOSTATIC CONTROL AND SWITCHING APPARATUS

James B. Allen, Richardson, and Glen C. Shepherd, Garland, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 17, 1973, Ser. No. 425,648
Int. Cl. H01h *37/12*
U.S. Cl. 337—347 **9 Claims**



1. Thermostatic control and switching apparatus comprising:

a switching assembly having at least one contact arm movable toward and away from a stationary contact;

a first housing enclosing said switch assembly;

a rotary collar adapted when rotated to actuate said switching assembly to open and close said contacts, said collar carrying a cam having a face formation for moving said contact arm in a plane parallel to the axis of said collar; a switch enclosed in a second housing;

a thermostatic strip supported on and spaced from said second housing and mechanically linked to said switch, said strip being responsive to changing ambient temperatures to open and close said switch;

means for adjusting the thermostatic strip to open and close said switch at various preselected temperatures, said adjusting means comprising a shaft coaxial with said collar and projecting therethrough; and

said first housing being secured in superposed position on said second housing with said thermostatic strip interposed therebetween.

3,878,499
THERMOSTAT

Antonio Concin, Via Martiri di Belfiore, Monza, Italy (20052)

Filed July 20, 1973, Ser. No. 381,161
Int. Cl. H01h *85/16*
U.S. Cl. 337—354 **11 Claims**

1. A double-interruption thermostat comprising:

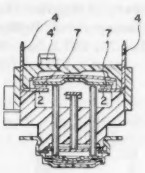
a body of electrically insulating material;

a switch having a pair of fixed contacts electrically insulated from each other and attached to said body, and a pair of mating contacts biased into contacting engagement with said fixed contact;

an electrically conductive connecting strap carrying one of said movable contacts at each of its ends;

a bimetallic element having edges restrained by said body and portions between its edges movable responsive to temperature change: and

a push-rod having a first end adjacent said bimetallic element and a second end adjacent said strap between the ends of said strap, said push-rod dimensioned for effecting movement of said conductive strap responsive to movement of portions of said bimetallic element, thereby breaking contact between both pairs of engaged contacts simultaneously at a predetermined temperature.

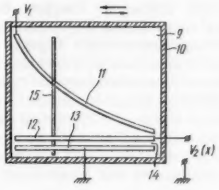


3,878,500

PHOTORESISTIVE-POSITION-SENSITIVE INSTRUMENT

Sergei Vasilievich Svechnikov, Kolomensky pereulok 10, kv. 17, and Anatoly Kuzmich Smovzh, ulitsa Bogomoltsa 7/14, kv. 153, both of Kiev, U.S.S.R.

Filed Jan. 22, 1973, Ser. No. 325,929
Int. Cl. H01c *7/08*
U.S. Cl. 338—15 **3 Claims**



1. A photoresistive position-sensitive instrument comprising: a distributed resistive layer; an equipotential electrode; a photoresistive layer disposed between said distributed resistive layer and said equipotential electrode; a movable light probe illuminating a region of said photoresistive layer an additional electrode disposed in parallel to said equipotential electrode; an additional layer of photoresistive material disposed between said additional electrode and said equipotential electrode, the resistance of whose region illuminated by the movable light probe serves as the load output impedance; the intensity of said light probe and the environmental temperature being measurable by said instrument.

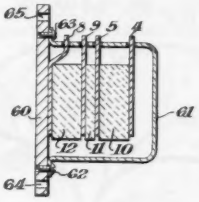
3,878,501

ASYMMETRICAL DUAL PTCR PACKAGE FOR MOTOR START SYSTEM

William L. Moorhead, and Manfred Kahn, both of Williamstown, Mass., assignors to Sprague Electric Company, North Adams, Mass.

Filed Jan. 2, 1974, Ser. No. 430,337
Int. Cl. H01c *7/04*
U.S. Cl. 338—22 R **3 Claims**

1. A PTCR package comprising a first and a second PTCR being thermally coupled therebetween, said first PTCR having a lower anomaly temperature than said second PTCR, and a selective heat removal means for providing stronger thermal coupling of said second PTCR than that of said first PTCR to the environment of said package.

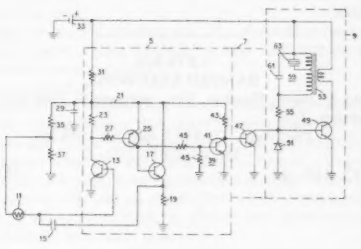


3,878,502

ULTRASONIC TEMPERATURE TELEMETRY SYSTEM

James M. Rochelle, Rt. 7, Barnard Rd., Knoxville, Tenn. 37921

Filed June 26, 1973, Ser. No. 373,712
Int. Cl. G01k *7/22*, *1/02*; **H04b** *11/00*
U.S. Cl. 340—5 R **10 Claims**



1. An acoustic temperature telemetering transmitter, comprising:

a sensor for monitoring the temperature to be telemetered, said sensor being located in heat transfer relation with the temperature to be monitored and having a resistance proportional to temperature;

a modulating circuit means for producing fixed period modulating pulses at intervals responsive to the resistance of said sensor, said modulating pulses having a period substantially less than said intervals;

an acoustic projector;

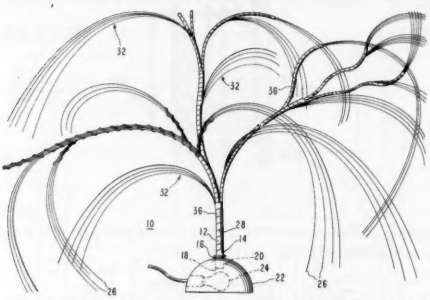
a gateable oscillator circuit connected to said projector and operable at a carrier frequency when gated "On" sufficient to project acoustic energy from said projector when gated "On"; and

a gating circuit means connected between said modulating circuit and said oscillator for gating said oscillator "On" for a fixed period equal to the period of said modulating pulses and "Off" for the remaining period of each of said intervals so that said transmitter projects pulses of acoustic energy from said projector at intervals related to said temperature being monitored.

3,878,503
DECORATIVE STRUCTURE UTILIZING OPTICAL FIBERS

Edward C. Martin, Oxnard, Calif., assignor to International Fiber Optics, Oxnard, Calif.

Filed Jan. 31, 1974, Ser. No. 438,216
Int. Cl. F21p 1/02
U.S. Cl. 240—10 L 5 Claims

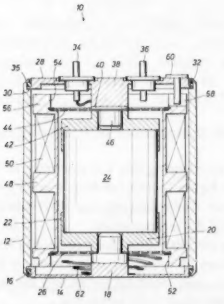


5. In a decorative structure comprising a plurality of optical fibers arranged in sub-groups to form a plurality of branches and sub-branches, and wherein one end of said plurality of optical fibers is placed within proximity of a light source, an improved method of supporting said optical fiber branches and sub-branches comprising the steps of arranging said optical fibers into branches and sub-branches; spirally winding bendable wire supports around and along said branches and sub-branches to confine and support the same; and wherein said adjacent segments of said spirally wound wire are spaced apart so that sub-branches of optical fibers can extend therebetween.

3,878,504
DAMPED GEOPHONE

Harold A. Sears, Houston, Tex., assignor to Hall-Sears, Inc., Houston, Tex.

Filed Sept. 21, 1973, Ser. No. 399,361
Int. Cl. G01v 1/16
U.S. Cl. 340—17 18 Claims



1. In an electromagnetic geophone including a cylindrical casing, an annular coil-mass assembly in said casing, a cylindrical permanent magnet assembly in the bore of said coil-mass assembly, and a spring suspension system for resiliently mounting one of said assemblies for axial movement relative the other of said assemblies, said system comprising;

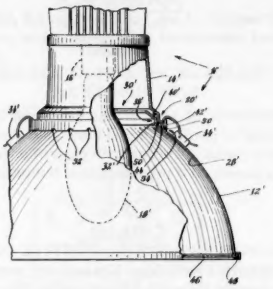
a pair of horizontal spring spiders for coaxially maintaining one assembly relative to the other assembly, said horizontal spiders exerting negligible restoring forces in a vertical direction, and

spring means elastically supporting for reciprocating axial movement the weight of said one assembly.

3,878,505
INDEPENDENTLY REMOVABLE REFLECTOR AND FILTER

Joseph George Seibert, Arlington Heights, Ill., assignor to Harvey Hubbell Incorporated, Bridgeport, Conn.

Filed May 21, 1973, Ser. No. 362,090
Int. Cl. F21v 17/00
U.S. Cl. 240—25 9 Claims



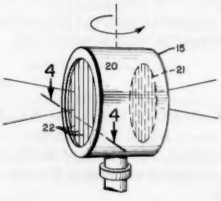
1. In an electrical luminaire of the type wherein a lamp is secured on a housing to which is affixed a reflector of symmetrical configuration about the lamp, the improvement comprising:

said reflector being detachable from said housing and being joined thereto at a continuously compatible interface symmetrical about the longitudinal axis of the lamp, said continuously compatible interface being located by a cylindrical step engaging a cylindrical seat and an annular groove being concentrically disposed around said cylindrical seat to cooperate with fastening means for securing said reflector on said housing, said cylindrical seat including a cylindrical shoulder concentrically disposed about a cylindrical recess, said cylindrical shoulder having ventilated ribs disposed therearound and an open cell gasket being disposed between said ventilated ribs to create a filtered vent across said continuously compatible interface.

3,878,506
AIRPORT LIGHTING AND RADAR REFLECTOR COMBINATION

David W. Young, 627 N. Beachwood Dr., Hollywood, Calif. 91506

Continuation-in-part of Ser. No. 385,534, Aug. 3, 1973. This application Aug. 20, 1973, Ser. No. 389,787
Int. Cl. H01q 1/06; G08g 5/00
U.S. Cl. 340—27 NA 4 Claims



1. In combination:

a. an airport guidance light structure permanently attached at an airport facility and including a light transparent

glass cover through which light is directionally transmitted in the form of a beam; and

b. A radar reflector integrally formed with said cover comprising a high pass filter for transmitting visisble light frequencies and reflecting lower frequencies including the frequency of radar reflection, said high pass filter comprising a series of thin parallel conductors secured to and extending along the glass, said conductors being spaced apart on the order of one fourth of a wave length of the frequency of the radar radiation to be reflected to thereby enhance echo signals from radar radiation impinging on the light structure whereby the pilot of an aircraft equipped with a high resolution radar can readily detect the presence of the guidance light structure on his radar screen.

3,878,507

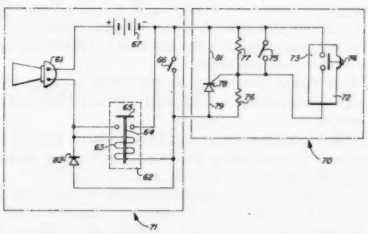
SENSOR DEVICE AND ALARM CIRCUIT FOR FUEL TANKS

Homer L. Medlock, 3242 E. Hubbell, Phoenix, Ariz. 85008

Filed Apr. 15, 1974, Ser. No. 460,702

Int. Cl. B60r *25/10*

U.S. Cl. 340—63 **4 Claims**



1. A warning device for fuel tanks having associated battery, alarm device and circuitry including an alarm switch comprising in combination:

an electric switch comprising a housing, a spring biased plunger mounted therein for making and breaking a pair of electrical contacts therein,

means for mounting said switch on a fuel tank fill pipe juxtapositioned to its cover,

said plunger being arranged to extend outwardly of said housing into the path of movement of said cover when said cover is mounted on the fill pipe,

means for connecting said electrical contacts of the warning device electrically across the contacts of the alarm switch of the alarm device,

a control switch connected in series with said electrical contacts of said warning device to selectively interupt the circuit to the alarm device,

said electric switch comprising a hermetically sealed microswitch, and

a controlled rectifier having an anode, a cathode and a gate, said anode and cathode being connected in series across the alarm switch of the alarm device, and

said gate being connected in series with said electrical contacts of said electric switch,

whereby the associated circuitry of the alarm circuit is energized upon movement of the cover of the fuel tank with reference to the fill tank.

3,878,508

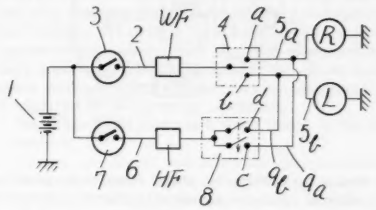
COMBINED TURN SIGNAL AND HAZARD WARNING SIGNALING SYSTEM FOR A VEHICLE

Masaru Suzuki, Chiryu, Japan, assignor to Kabushiki-Kaisha Tokai Rika Denki Seisakusho, Nishi-Kasugai-gun, Aichi-ken, Japan

Continuation of Ser. No. 132,399, April 8, 1971, abandoned. This application Dec. 20, 1972, Ser. No. 316,881

Int. Cl. B60q *1/50*

U.S. Cl. 340—81 R **3 Claims**



1. A combined turn signal and hazard warning signaling system for a vehicle comprising

normally inactive left-hand and right-hand signaling lamps,

a turning signal circuit having

a first flasher,

first switch means for selectively coupling said first flasher in series with either of the two signal lamps to indicate a left-hand or a right-hand turn of the vehicle, when said first flasher is energized, and

an ignition switch for selectively connecting said first flasher in series with an electric power source to be energized thereby, and

a separate hazard-warning circuit connectable directly to said power source in parallel with said turning signal circuit and comprising

a second flasher,

a single-throw, double-pole switch connected in series with said second flasher and operable selectively to connect both said lamps simultaneously to said second flasher for operation thereby when said second flasher is energized,

a motion-sensing switch connected directly to said power source and to said second flasher, which closes automatically when the vehicle is parked and opens when the vehicle is in motion, whereby

said motion-sensing switch operates to connect said second flasher in circuit with said power source for energization thereby, when the vehicle is parked, to effect flashing of both said lamps simultaneously, and is operative automatically to break the connection of said second flasher and said lamps to said power source when the vehicle is running.

3,878,509

CHARACTER RECOGNITION SYSTEM

Yoshiyasu Kikuchi; Hiroaki Kawada; Takanori Yamaguchi; Tadashi Ito, and Hideo Tsuiki, all of Tokyo, Japan, assignors to Nippon Electric Company, Limited, Tokyo, Japan

Filed Oct. 26, 1973, Ser. No. 410,126

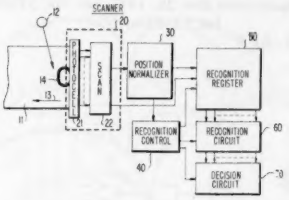
Claims priority, application Japan, Oct. 27, 1972, 47-107691

Int. Cl. G06k *9/12*

U.S. Cl. 340—146.3 H **2 Claims**

1. In a character recognition system including means for scanning an unknown character and for generating therefrom a serial train of binary signals representing black and white elements of the unknown character, a two-dimensional unknown character storage matrix defining in one corner thereof a comparison zone comprising a plurality of adjacent bit positions, means for loading the binary signal train into the matrix such that the outermost bits of the unknown character on two

adjacent edges abut the adjacent edges of the matrix that meet at the corner where the comparison zone is defined, means for establishing a bit in the binary signal train representing the outermost corner of the unknown character dimensions at the intersection of said two adjacent edges, and a plurality of standard character matrices, the improvement comprising:



a. means for shifting the binary signal train, and thus the unknown character represented thereby, across the matrix in a generally diagonal direction toward the corner thereof opposite the comparison zone corner, and

b. means for comparing the unknown character with each of the standard character matrices, during the shifting movement of the unknown character, each time the outermost corner representing bit coincides with a bit position in the comparison zone.

3,878,510

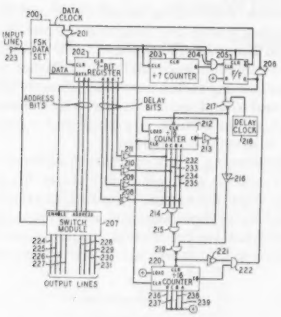
ADDRESSABLE SWITCH WITH VARIABLE INTERVAL BLINDING

James Warren Smith, Middletown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Berkeley Heights, N.J.

Filed May 2, 1974, Ser. No. 466,191

Int. Cl. H04q *9/00*

U.S. Cl. 340—147 R **15 Claims**



1. A switching circuit, including addressable switch means responsive to the reception of a multibit control word on a signaling path from a central station for extending the signaling path to a selected remote location, the signaling path being capable of carrying information between the central station and the selected remote location, characterized in that the switching circuit further includes,

timing means responsive to signals on the signaling path and operative upon the reception of the multibit control word for blinding the switch means to the multibit control words for a delay interval, and

means responsive to the timing means for maintaining the extended signaling path throughout the delay interval duration,

whereby information may be carried between the central station and the selected remote location for the duration of the delay interval.

3,878,511

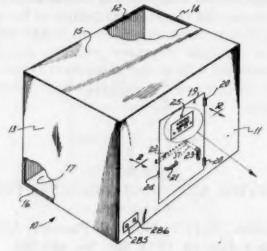
VAULT PROTECTED WITH ELECTRONIC TIME AND COMBINATION LOCK

Howard S. Wagner, Cincinnati, Ohio, assignor to The Mosler Safe Company, Hamilton, Ohio

Filed Dec. 3, 1973, Ser. No. 421,267

Int. Cl. E05b *49/00*

U.S. Cl. 340—147 MD **2 Claims**



1. An electronic combination lock system for permitting access to persons correctly entering the digits of a predetermined multi-digit combination, comprising:

digit entry means for entering multiple digits when access is desired, said digit entry means generating electrical signals correlated to the digits entered, said digit entry means including:

a. display means for displaying at a given time only a selected one of a multiplicity of different digits, said display means being sequentially operable to sequentially display different selected digits,

b. digit signal generating means for generating electrical signals correlated to the digit displayed by said display means,

c. a first actuator means actuatable by a person seeking access for controlling the display of digits in response to said electrical digit signals, and

d. a second actuator means actuable by a person seeking access for controlling the entry of a digit into said system to cause digit signals correlated to the displayed digit to be output from said digit entry means, said second actuator being actuatable independently of the actuation of said first actuator means,

validation means responsive to the electrical signals generated by said data entry means for determining if the digits entered correspond correctly to said predetermined multi-digit combination and generating a first electrical control signal upon correct correspondence, and

means responsive to said first electrical control signal for permitting access.

3,878,512

DATA TRANSMITTING SYSTEM

Shinzo Kobayashi, and Takahisa Oota, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 29, 1973, Ser. No. 392,532

Claims priority, application Japan, Aug. 29, 1972, 47-86527

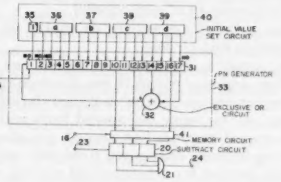
Int. Cl. H04q *9/00*; **H04j** *3/00*

U.S. Cl. 340—168 R **18 Claims**

1. A method for transmitting data from a plurality of terminal stations to a central office by using a common line or channel, wherein more than one of said terminal stations simultaneously transmit data to said central office, comprising the steps of:

retransmitting said data after a time delay which is respectively controlled to be variable at every retransmission of each of said simultaneously transmitting terminal stations;

transmitting a confirmation signal from said central office in response to an accurate receipt of data transmitted from a terminal station; and,



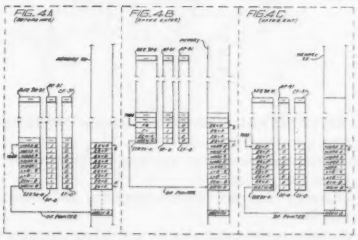
ceasing said retransmission of said data from one of said terminal stations upon the receipt thereof of a confirmation signal from said central office signifying the accurate receipt of said data from said station by said central office.

3,878,513

DATA PROCESSING METHOD AND APPARATUS USING OCCUPANCY INDICATIONS TO RESERVE STORAGE SPACE FOR A STACK

John R. Werner, Glendora, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Feb. 8, 1972, Ser. No. 224,435
Int. Cl. G06f *7/00, 13/00*
U.S. Cl. 340—172.5 **18 Claims**



1. A programmable data processing system for executing a program which includes a plurality of blocks and which includes program operators that order entry into and exit from the blocks, the system comprising:

main memory means comprising a plurality of addressable memory means locations and having a first access time, one of the memory means locations storing a mark word for a first block which has been entered and which has ordered entry into a second block before having been exited, said mark-word-storing memory means location serving as a base location for a stack area having a depth, said stack area comprising a plurality of the memory means locations and storing a stack of words for the first block; and

a data processor comprising:

a. a local memory comprising a plurality of addressable local-memory locations and having a second access time which is lower than the first access time, the local-memory locations storing a stack of words, including a mark word and a top of stack word, for the second block, the mark word stored in the local memory containing a difference value pointing to said mark-word-storing memory means location and indicating the depth of said stack area,

b. register means storing a pointer to a local-memory location that stores the word at the top of the local memory stack;

c. a plurality of occupancy indicating means, each associated with a different one of the local memory locations and indicating whether its associated location stores a stack word, and each settable and resettable to indicate that its associated location respectively stores or does not store a stack word;

d. means for accessing the main memory means to obtain program operators and stack-area-stack words; and

e. reserving means responsive to an obtained program operator ordering an exit from the second block for reserving local-memory locations such that each of a plurality of stack-area-stack words obtained after the second block is exited will have a local-memory location allocated for its storage, the reserving means comprising

1. for reading out said mark word stored in the local memory,

2. means responsive to said difference value contained in the read out mark word for producing a pointer and means for loading the produced pointer into the register means, and

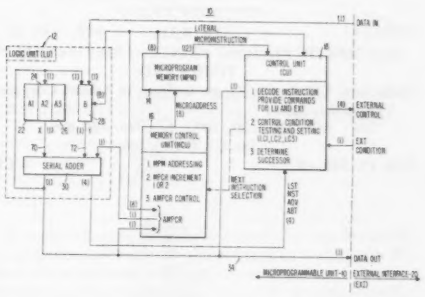
3. means for resetting the occupancy indicating means associated with each of a plurality of local-memory locations to indicate that the associated locations have been allocated to store stack words but that the obtaining of stack words for storage therein has been at least temporarily postponed.

3,878,514

LSI PROGRAMMABLE PROCESSOR

Ulbe Faber, Honeybrook, Pa., assignor to Burroughs Corporation, Detroit, Mich.

Filed Nov. 20, 1972, Ser. No. 307,863
Int. Cl. G06f *9/16*
U.S. Cl. 340—172.5 **9 Claims**



1. An apparatus for processing data in accordance with a stored program comprising:

memory means for storing a plurality of microinstructions, each of said microinstructions including control information;

a serial input bus for receiving information bits to be processed;

a serial output bus for transferring processed information bits from said processor;

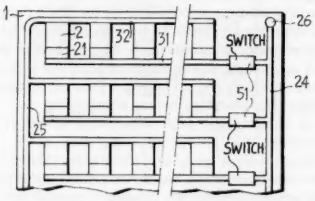
means connected between said buses and coupled to said memory means for accessing at least one of said plurality of microinstructions and providing said control information; and

at least one logical unit connected between said buses and responsive to said provided control information received in parallel from said means for accessing for serially performing logical operations on information bits received by said input bus.

3,878,515
ERASABLE THERMOPLASTIC SYSTEM FOR THE OPTICAL STORAGE OF DATA

Luigi D'Auria, Paris, France, assignor to Thomson-CSF, Paris, France

Filed July 27, 1973, Ser. No. 383,197
Claims priority, application France, Aug. 1, 1972, 72.27709
Int. Cl. G11c *11/46, 13/04*
U.S. Cl. 340—173 TP **8 Claims**

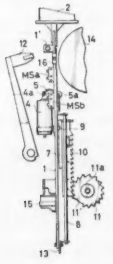


1. Erasable system for the optical storage of data, said arrangement comprising: a substrate, a plurality of adjacent photosensitive storage elements laid on said substrate, in succession, a plurality of electrically conductive paths, a film of photoconductive materials and a film of thermoplastic material; each of said paths defining one of said storage elements, a plurality of switching elements being selectively optically activated, each storage element being electrically connected in series with a different one of said switching elements to form a unit electrical connecting means, having terminals on which is available external electrical energy; each of said photosensitive storage elements incorporating an one said path causing the writing and the erasure of said data upon being energized, at least some of said storage elements being electrically connected in parallel to each other via a switching element to said electrical connection means.

3,878,516
AUTOMATIC FEEDING PRINTING MECHANISM FOR TIME CARD

Reiji Sato, Yokohama, Japan, assignor to Amano Corporation, Yokohama, Japan

Filed Dec. 28, 1973, Ser. No. 429,405
Int. Cl. G07c *1/06*
U.S. Cl. 346—82 **4 Claims**



1. A card processing mechanism for a recording time clock comprising:

a. means defining a guide channel;

b. drive means in said channel for moving a time card partly inserted into said channel inward and outward of said channel;

c. first actuating means in said channel responsive to engagement by said partly inserted card for actuating said drive means and for thereby moving said card inward of said channel;

d. reversing means responsive to disengagement of said card from said first actuating means during said inward moving for reversing said drive means and for thereby moving said card outward of said channel;

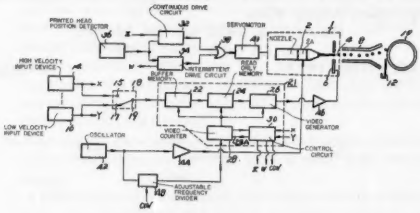
e. printing means for producing an imprint on a portion of said card in said channel;

f. second actuating means in said channel and spaced from said first actuating means in the direction of said inward moving for engagement by said card during said inward moving and for being disengaged from said card during said outward moving, said second actuating means responding to being disengaged from said card during said outward moving for actuating said printing means.

3,878,517
INK JET SYSTEM OF CHARGE AMPLITUDE CONTROLLING TYPE

Takeshi Kasubuchi; Yuji Sumitomo, and Masahiko Aiba, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed June 1, 1973, Ser. No. 366,044
Int. Cl. G01d *15/18*
U.S. Cl. 346—75 **1 Claim**



1. An ink jet system printer of a charge amplitude controlling type comprising a nozzle,

an ultrasonic transducer exciting the nozzle for issuing a stream of ink drops,

a charging electrode for charging the ink drops from the nozzle,

a charging signal generator for providing charging signals to be applied to the charging electrode in accordance with input information to be recorded,

a pair of deflection electrodes for deflecting the charged ink drops into selective trajectories in accordance with the amplitudes of charges on the ink drops by means of a fixed field potential between said electrodes,

a record receiving member for forming images indicative of the input information by means of deposition of the charged and deflected ink drops,

a head carrying the nozzle and the charging electrode,

drive means for moving the head transversely of said trajectories,

an oscillator providing an output signal of a predetermined frequency for activating the ultrasonic transducer,

a high velocity input device for continuously introducing the input information to the charging signal generator at a high rate and providing a high velocity control signal,

a low velocity input device for intermittently introducing the input information to the charging signal generator at a lower rate and providing a low velocity control signal,

a first selection circuit for selecting any one of the input devices to selectively convert said printing unit to a high velocity printing unit and a low velocity printing unit,

control means connected with said input devices and responsive to said high and low velocity control signals to provide high and low rate control signals and high and

low velocity drive signals in correlation with the selective energization of said input devices,

a frequency divider connected with said control means and the output of said oscillator responsive to said high and low rate control signals to effect a variable rate of frequency division, and means for applying the output from said oscillator to the charging signal generator through the variable frequency divider to modify the frequency of occurrence of said charging signals and the resulting ratio of charged ink drops to the total ink drops in the stream by adjustment of the frequency division rate of the frequency divider in response to said rate control signals,

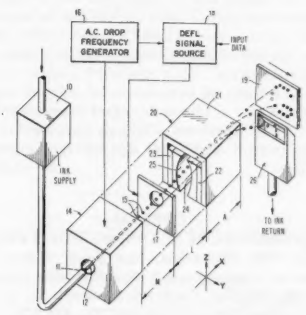
said drive means connected with said control means and responsive to said high and low velocity drive signals to modify the velocity of movement of said head in correlation with said ratio to thereby control the printing velocity of said printer.

3,878,518

METHOD AND APPARATUS FOR LINEARLY AMPLIFYING THE DEFLECTION OF A DROPLET OF A LIQUID MAGNETIC STREAM

Richard Lawrence Garwin, Scarsdale, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 4, 1974, Ser. No. 439,495
Int. Cl. G01d *15/18*
U.S. Cl. 346—1 **11 Claims**



1. A method of controlling the deflection of any selected droplet of a magnetic liquid stream including:

separately deflecting each selected droplet from its initial path to produce a selected deflected trajectory of the droplet;

and applying to each of the droplets a static magnetic field increasing substantially uniformly in strength in the plane of the deflected trajectory of the deflected droplet in each direction from the initial path of the droplets to amplify the deflected trajectory of the deflected droplet over a much greater distance of travel of the droplet in the direction of the initial path of the droplet than the distance of travel of the droplet in the direction of the initial path of the droplet in which it initially was deflected to the selected deflected trajectory.

3,878,519

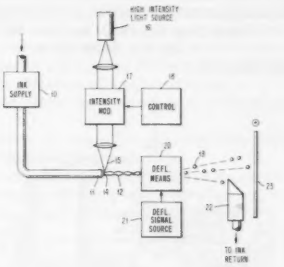
METHOD AND APPARATUS FOR SYNCHRONIZING DROPLET FORMATION IN A LIQUID STREAM

James H. Eaton, Armonk, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 31, 1974, Ser. No. 438,105
Int. Cl. G01d *15/18*
U.S. Cl. 346—1 **19 Claims**

1. A method of forming droplets at a substantially constant breakoff point and with substantially uniform distances from each other from a liquid stream exiting from an opening or the like including:

selectively altering the surface tension of spaced segments of the stream by initially reducing the surface tension of each of the spaced segments of the stream as it passes a predetermined portion of its path and before random



break up of the stream into droplets would occur after the stream leaves the opening;

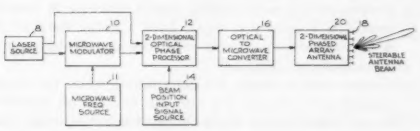
and controlling the amount of initial reduction of the surface tension of each of the spaced segments of the stream to control the breakoff point of the droplets from the stream at a substantially constant breakoff point and with substantially uniform distances from each other.

3,878,520

OPTICALLY OPERATED MICROWAVE PHASED-ARRAY ANTENNA SYSTEM

Maynard L. Wright, San Jose; Matt Lehmann, Menlo Park, and Raymond C. Cumming, Palo Alto, all of Calif., assignors to Stanford Research Institute, Menlo Park, Calif.

Filed Jan. 24, 1973, Ser. No. 326,447
Int. Cl. H01q *3/26*
U.S. Cl. 343—854 **13 Claims**



1. In a phased-array antenna system of the type having an array of antenna elements to which excitation is applied, the method of exciting said elements comprising

illuminating a two-dimensional area with an optical analog of a two-dimensional excitation pattern for said antenna elements, comprising

generating a reference light beam,

generating a plurality of separately operable, normally closed light shutters in a two-dimensional array,

directing a different one of said plurality of different radio frequency, modulated light beams at one side of a different one of said normally closed light shutters,

opening desired ones of said light shutters to enable light to emanate from different positions in said two-dimensional array,

directing light emanating from said different positions at said two-dimensional area, and

directing said reference light beam at said two-dimensional area,

generating a plurality of electrical signals responsive to said optical pattern at a plurality of locations over said two-dimensional area, equal in number to the number of antenna elements to be excited, and

applying said plurality of electrical signals to said plurality of antenna elements.

3,878,521

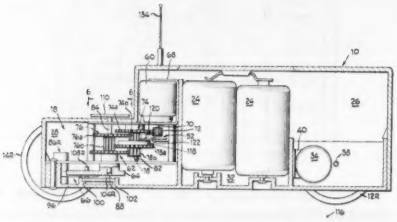
REMOTELY CONTROLLED TOY HAVING A NON-FREQUENCY DISCRIMINATING RECEIVER

Gunars Licitis, Lombard, and Norman Kramer, Skokie, both of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed June 12, 1973, Ser. No. 369,316

Int. Cl. A68h *30/04*

U.S. Cl. 343—225 **22 Claims**



1. In a remote controlled toy combination including a responsive toy structure, means separate from said toy structure for generating a command signal, electrical receiver control means carried by said toy structure for receiving said command signal and generating an electrical control current in response thereto, and means for translating said control current into a desired response, the improvement in said electrical receiver control means comprising:

means defining a normally nonconducting electrical circuit operably connected to said translating means for operating said translating means whenever said circuit is conducting the control current, said electrical circuit including in electrical connection

an electrical power source;

a nonfrequency discriminating signal detector to detect a momentary command signal over a broad band of frequencies and convert said command signal into a supplemental electrical signal;

electronic switch means for determining when the control current is to initially flow through said circuit, said electronic switch means being changeable in response to said supplemental electrical signal from a normally off nonconducting state wherein electricity does not flow through the electronic switch means and an on conducting state wherein electricity flows through said electronic switch means and the circuit; and

an interrupter switch for changing said electronic switch means to its off state and for stopping the control current a predetermined time after the circuit commences to conduct electricity, said predetermined time defining the period during which said control current actuates said translating means.

3,878,522

TRACKING RECEIVER

Richard J. Gurak, Summit; Basil C. Thompson, Lake Hopatcong; Gerald Rabow, Nutley; John P. Filo, Basking Ridge, all of N.J., and Arnold J. Seipel, Plantation, Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 7, 1973, Ser. No. 386,232

Int. Cl. G01s *5/02*

U.S. Cl. 343—117 **4 Claims**

1. In a receiver for tracking a signal radiated from a remote source, a tracking and acquisition loop comprising:

a voltage controlled local oscillator;

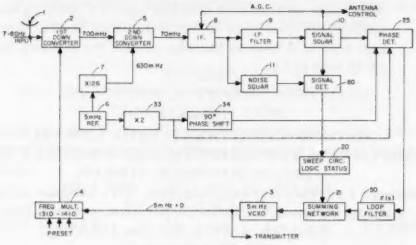
means for multiplying the frequency from the local oscillator by a pre-selected number;

means for mixing the signal from said remote source with said multiplied signal so as to produce an IF signal;

a cos-limited tangent phase detector having two pairs of input circuits and an output circuit,

said cos-limited tangent phase detector being controlled such that the output signal therefrom is prevented from increasing in magnitude beyond a predetermined level;

means for producing a pair of quadraturely phased reference signals at the IF frequency;



means for feeding said IF signal and one of said reference signals to one pair of input circuits and for feeding said IF signal and the other of said IF signals to the other pair of input circuits of said cos-limited tangent phase detector;

a filter; and

means for feeding the output signal developed in the output circuit of said cos-limited tangent phase detector to the input of said filter and for feeding the output of said filter to the control element of said voltage controlled local oscillator.

3,878,523

GENERATION OF SCANNING RADIO BEAMS

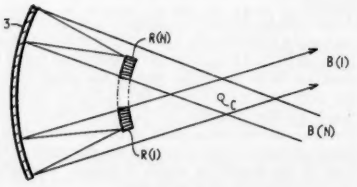
John Paul Wild, Strathfield, New South Wales, Australia, assignor to Commonwealth Scientific and Industrial Research Organization, Canberra, Australia

Filed Feb. 1, 1973, Ser. No. 328,820

Claims priority, application Australia, Feb. 7, 1972, 7882/72

Int. Cl. G01s *1/16*

U.S. Cl. 343—108 M **9 Claims**



1. An aerial for producing a scanning radio beam comprising:

a. a substantially cylindrical reflector having a surface the shape of which is substantially the surface produced by the partial rotation of a generating curve of finite length about an axis, the reflector being so mounted that the said axis is the axis of rotation of the said beam, and

b. a plurality of radiating elements disposed about an arc centered on the said axis, and of radius substantially half that of the cylindrical reflector, each element being ar-

ranged to radiate a beam towards the reflector, which radiation is reflected from the portion thereof,

said beam being divergent in the direction parallel to the axis to produce reflected radiation comprising a planar fan beam, with the plane of the fan parallel to the said axis of rotation, and including means to excite a group of four adjacent elements sequentially, the power to each element being modulated with time in accordance with a cosine-squared function, a detector responsive to the power of incident radiation being located substantially at the axis of symmetry of the reflected radiation to monitor the scanning beam.

3,878,524

PROCESS FOR PREPARING RADAR REFLECTING MASS

Franciszek Olstowski, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed July 16, 1965, Ser. No. 472,679

Int. Cl. H01q *15/00*

U.S. Cl. 343—18 B **4 Claims**

1. A method for producing a radar reflecting cloud of particulate graphite capable of producing a false radar image on a radar scope which comprises:

1. contacting acid treated graphite with a flowing stream of hot gas at a temperature greater than 150°C. to expand said graphite,
2. passing said expanded graphite into the atmosphere to produce a false radar image.

3,878,525

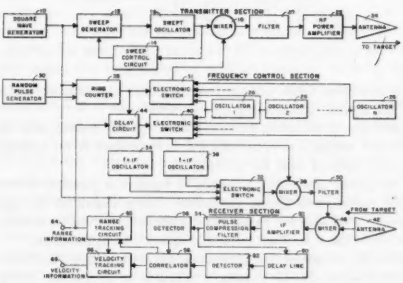
FREQUENCY JUMPING CW RADAR

Frederick C. Alpers, Riverside, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 3, 1965, Ser. No. 477,674

Int. Cl. G01s *9/24*

U.S. Cl. 343—14 **3 Claims**



1. In a frequency jumping radar system, the combination comprising:

a. a square wave generator for generating square wave output signals,

b. a sweep generator having a first input coupled to the output of said square wave generator, a second input and an output for generating a sweep voltage varying periodically in response to the change in polarity of said square wave signal,

c. an oscillator having an input coupled to the output of said sweep generator and an output and generating a swept frequency signal in response to the output signal from said sweep generator, the second sweep generator input being coupled to said oscillator output,

d. a random pulse generator for generating random pulses,

e. a ring counter having a first input coupled to the output of said square wave generator, a second input coupled to the output of said random pulse generator and having an output,

f. a frequency control section including a source of multiple signals each of a different frequency,

g. mixer means having a first input coupled to the output of said swept oscillator and having a second input, and an output,

h. first electronic switch means coupled between said multiple signal source and the second input to said mixer means and being coupled to said ring counter for randomly coupling signals of a given frequency to said mixer means for the duration of said square wave signal,

i. antenna transmitting means coupled to the output of said mixer means for transmitting the output signals from said mixer in the direction of a selected target,

j. delay circuit means for generating a delayed reference signal,

k. antenna receiving means for receiving reflected signals from the selected target; and

l. receiver circuit means coupled to said delay circuit means and said antenna receiving means for deriving range and velocity information of the selected target.

3,878,526

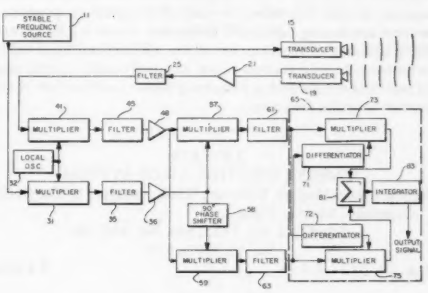
DOPPLER SIGNAL PROCESSOR USING QUADRATURE REFERENCE SIGNALS

Norman E. Pedersen, Wilmington, Mass., assignor to Panametrics, Inc., Waltham, Mass.

Filed June 29, 1973, Ser. No. 375,041

Int. Cl. G01s *9/42*

U.S. Cl. 343—7.7 **4 Claims**



1. Apparatus for processing the Doppler shifted components of echo signals reflected back from an environment in response to a radiated signal, said apparatus comprising:

means for generating a first Doppler information signal using a first reference signal which is derived from the radiated signal;

means providing a second reference signal which is in phase quadrature with said first reference signal;

means for generating a second Doppler information signal using said second reference signal;

means for differentiating each of said Doppler information signals thereby to provide a respective differential signal;

means for generating a first product signal having an amplitude which is proportional to the product of the amplitude of a first of said Doppler information signals with the amplitude of the differential signal corresponding to the other of said Doppler information signals;

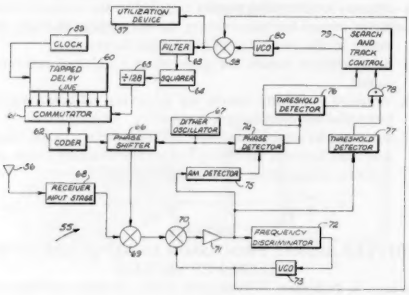
means for generating a second product signal having an amplitude which is proportional to the product of the amplitude of the other of said Doppler information signals with the amplitude of the differential signal corresponding to said first Doppler information signal; and

means for generating an output signal having an amplitude which varies as a function of the time integral of the difference between the amplitudes of said product signals.

3,878,527
RADIANT ENERGY RECEIVER CIRCUITS

Ernest Isaac Rensin, Northridge, and Tom Schnerk, Granada Hills, both of Calif., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Oct. 7, 1970, Ser. No. 78,790
Int. Cl. G01s 9/42
U.S. Cl. 343—7.7 **13 Claims**

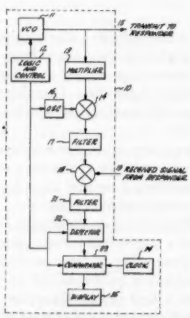


7. In a system utilizing a pseudonoise coded carrier wave reflected from a moving target, a receiver comprising: first means responsive to the coded reflected wave and to an internal code to produce a first signal which is the decoded carrier; second means responsive to said first signal to produce a second alternating signal of a frequency which is a function of the frequency of the Doppler of the carrier; and third means responsive to said second signal to supply said internal code to said first means with a frequency which is a function of said carrier Doppler frequency.

3,878,528
PASSIVE IDENTIFICATION SYSTEM

Henrie Lionel Majeau, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Oct. 12, 1973, Ser. No. 405,744
Int. Cl. G01s 9/56
U.S. Cl. 343—6.5 SS **9 Claims**



1. A passive identification system using a given range of frequencies for communication between a transceiver and at least one passive responder, comprising:

signal generating means in said transceiver for generating a frequency spectrum signal within said given frequency range, which frequency spectrum signal comprises a series of successive discrete frequencies;

means for transmitting said frequency spectrum to a passive responder, which responder retransmits to said transceiver selected frequencies from said series of successive discrete frequencies;

means in said transceiver and said responder for changing the frequency of each of said successive discrete frequencies by a given factor;

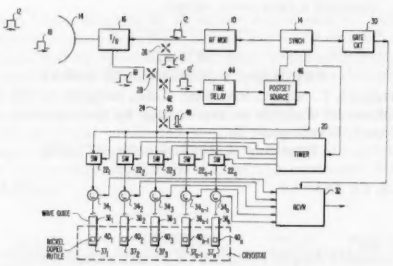
means in said transceiver for comparing said frequency spectrum with said retransmitted selected frequencies so as to determine coincidence between each of said frequency changed successive discrete frequencies transmitted to said responder, and the selected frequencies retransmitted from said responder to said transceiver; and,

means responsive to said comparing means for generating an identification code indicative of said coincidence with respect to each successive discrete frequency in said frequency spectrum signal.

3,878,529
MATCHED FILTER FOR RADAR UTILIZING SPIN-ECHO TECHNIQUES

Donald A. Bozanic; Dickron Mergerian, both of Baltimore, and Ronald W. Minarik, Lutherville, all of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 26, 1973, Ser. No. 327,025
Int. Cl. G01s 9/02
U.S. Cl. 343—5 R **8 Claims**



1. A matched filter system for providing signal correlation of an RF signal, comprising in combination:

means for generating and transmitting RF pulses and receiver means for receiving RF echo pulses from a target as a result of said RF pulse;

an RF pulse generator coupled to receive a portion of said RF pulse, said pulse generator being actuated by said portion of said RF pulse after a predetermined time delay to provide a second pulse for spin-echo apparatus;

a plurality of spin-echo elements, each including respective microwave cavity means located in a cryogenic atmosphere and a paramagnetic spin-echo sample situated in said cavity means;

circuit means for selectively coupling each spin-echo element to said RF pulse, said second pulse and said echo pulses;

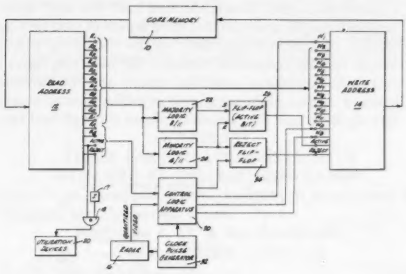
control circuit means coupled to and operating said circuit means to first couple all said spin-echo elements to receive said RF and said second pulse for a first predetermined time period thereby setting the spin system to the transmitted pulse, and subsequently thereafter sequentially coupling each spin-echo element to receive portions of said echo pulses for a predetermined relatively short time interval corresponding to a range gate, whereupon at least one spin-echo element will be responsive to said RF echo pulse to produce a correlated spin-echo signal therefrom; and

receiver means coupled to all said spin-echo apparatus for receiving as an input said spin-echo signal produced thereby.

3,878,530
RADAR VIDEO PROCESSING APPARATUS

Richard Dean Wilmot, Fullerton, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Mar. 15, 1965, Ser. No. 440,024
Int. Cl. G01s *7/44*
U.S. Cl. 343—5 DP **8 Claims**



1. An apparatus for processing successive video sweeps generated by a radar system and quantized into a series of range bins each including a 1 or a 0 representing a target hit or no target hit, respectively, said apparatus comprising: a memory device have a plurality of channels including 1, 2, 3, . . . $(n-1)$, n channels for storing n successive quantized video sweeps from said radar system, n being an integer no less than three, and A, B, active and reject channels for storing first and second code bits, active bits and reject bits, respectively; means coupled to said memory device and including a read address and a write address for reading from and writing into successive range bins of said plurality of channels in a direction corresponding to increasing ranges; means coupled from said read to said write address for transferring said quantized video from said 1, 2, 3, . . . $(n-1)$ channels to said 2, 3, . . . n channels, respectively; means coupled from said n channels of said read address to said active bit channel of said write address for generating an active bit in response to m 1's from the respective range bins of said n channels, m being an integer less than n; means coupled from said n channels of said read address to said active bit channel of said write address for erasing said active bit and any corresponding bit in said reject channel in response to a predetermined number less than m 1's from the respective range bins of said n channels; means coupled from said A, B and reject channels of said read address to said A, B, reject and said 1 channel of said n channels of said write address and responsive to said quantized video sweeps generated by said radar system for generating and writing a code in said A and B channels indicative of predetermined successive occurrences of 1's in said quantized video sweeps, for generating and writing 1 bits in said reject channel indicative of predetermined successive occurrences of 1's in corresponding range bins of no less than two successive video sweeps, and for writing said quantized video in said 1 channel of said n channels; and utilization means responsive to the simultaneous existence of 1's in said active channel and to the non-existence of 1's in said reject channel for indicating targets detected by said radar.

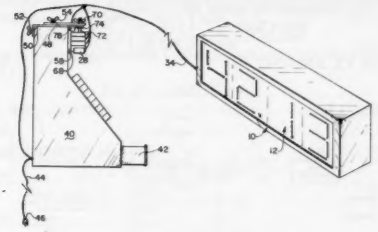
3,878,531
REMOTE MONITORING ATTACHMENT FOR A CASH REGISTER

Chester S. McClelland, 1808 Keokee St., Adelphi, Md. 20783

Filed Mar. 19, 1974, Ser. No. 452,548
Int. Cl. G08b *5/36*
U.S. Cl. 340—366 R **5 Claims**

1. A remote cash indicator for conspicuously displaying the sales amount indicated on a normally obstructed cash register, comprising

a shadow box having a large face for easy viewing from any part of a business area in front of the cash register, and means for transmitting the images of the digits of a cash

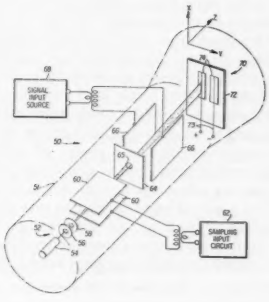


amount shown on the cash register to the face of said shadow box in the same order as they appear on the cash register.

3,878,532
HIGH-FREQUENCY ANALOGUE TO DIGITAL CONVERSION APPARATUS

Daniel C. Buck, Hanover, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 5, 1972, Ser. No. 259,431
Int. Cl. G08c *5/00*
U.S. Cl. 340—347 AD **14 Claims**



1. Apparatus for converting an analogue input signal of varying amplitude into corresponding digital signals, said apparatus comprising:

means for forming a beam of electrons;

a sampling plate for sampling the beam of electrons at a relatively high rate;

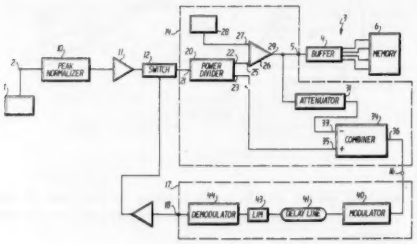
deflection means for deflecting the beam of electrons an amount dependent upon the varying amplitude of the analogue input signal; and

target means disposed to intercept the deflected beam of electrons and comprising a plurality of target portions, each responsive to the deflected electron beam for multiplying the incident electrons and for producing an amplified signal corresponding thereto, said target portions being so arranged with respect to the deflected electron beam and selected ones of said portions being so interconnected to provide a plurality of digital signals representative of discrete levels of the amplitude of the input signal.

3,878,533
HIGH SPEED ANALOG TO DIGITAL CONVERTER RECIRCULATING ANALOG INPUT FOR HIGH SPEED OUTPUT

Norbert Kleiner, Oakton, and Hill Montague, Reston, both of Va., assignors to Scope Incorporated, Reston, Va.

Filed Mar. 22, 1974, Ser. No. 453,773
Int. Cl. H03k *13/02*
U.S. Cl. 340—347 AD **9 Claims**



1. An analog to digital converter for providing a binary output indicative of an analog input comprising, in combination:

a switching circuit connected between the analog signal and an output terminal and being operable for a selectable period;

a single level comparator having an input terminal connected to the output of said switch and an output terminal, and further comprising a feedback terminal; and

a hard limited modulated channel connected between said feedback terminal and a second input of said switch, said switch including timing means for coupling a sample to said single level comparator and for connecting recirculated feedback from said feedback terminal to said input of said single level comparator, said single level comparator comprising a power divider having an input connected to the input of said single level comparator and first and second outputs, a one-bit comparator having a first input connected to an output of said power divider and a second input connected to a source of reference potential and an output connected to said output terminal, a combiner having a first input coupled to said one-bit comparator and a second input coupled to said power divider and an output coupled to said feedback terminal, and said hard limited modulated channel comprising a modulator, delay means and a demodulator connected in series.

3,878,534
BIPOLAR FLOATING INPUT, PARTICULARLY FOR DIGITAL PANEL METERS

Joshua Horwitz, and Bernard M. Gordon, both of Magnolia, Mass., assignors to Gordon Engineering Company, Wakefield, Mass.

Division of Ser. No. 125,078, March 17, 1971, Pat. No. 3,718,923, which is a division of Ser. No. 852,808, Aug. 25, 1969, abandoned. This application Oct. 13, 1972, Ser. No. 297,502
Int. Cl. H03k *13/20*
U.S. Cl. 340—347 NT **3 Claims**

1. A device for providing a digital display of the magnitude and sense of a bipolar analog voltage including an analog to digital converter and bipolar floating input means, said bipolar input means comprising:

a. floating input terminals for receiving a bipolalr analog voltage;

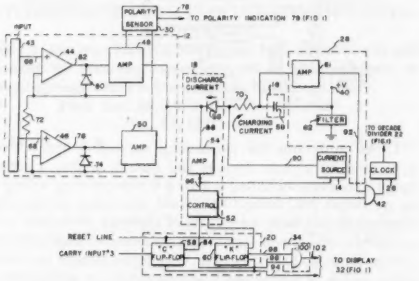
b. first amplifier means through which current can flow;

c. first operational amplifier means having a first input connected to a terminal of said bipolar input means and an inverting input and providing an output to said first amplifieir means for controlling the flow of current therethrough;

d. second amplifier means through which current can flow;

e. second operational amplifier means having a first input connected to a terminal of said bipolar input means and an inverting input and providing an output to said second amplifier means for controlling the flow of current therethrough; and

f. a conductive path interconnecting said first and second amplifier means and said inverting inputs of said first and second operational amplifier means including resistor means serially connected between the inverting input of said first operational amplifier means and the inverting input of said second operational amplifier means, current flowing from said first amplifier means through said resistor means to an output of said second operational amplifier means when the analog voltage applied to said first operational amplifier means is positive with respect to said analog voltage applied to said second operational amplifier means and current flowing from said second amplifier means through said resistor means to an output of said first operational amplifier means when the analog voltage applied to said second operational amplifier means is positive with respect to said analog voltage applied to said first operational amplifier means, said current flowing from said first amplifier means through said resistor means to said output of said second operational amplifier means and said current flowing from said second amplifier means through said resistor means to said output of said first operational amplifier means operating as a discharging current;



said analog to digital converter means comprising:

g. current source means for providing a precision charging current;

h. integrator means connected to said first and second amplifier means and providing a current flow therethrough and to said current source means and operative for integrating said discharging current and said charging current, the amplitude of said discharging current being specified by said analog input, and the amplitude of said charging current being specified by said current source means;

i. switch means for determining the duration of said discharging current being integrated by said integrator means;

j. control flip-flop means for operating said switch means and providing an output thereto;

k. clock means for generating a sequence of predeterminedly timed clock pulses;

l. a plurality of decade divider means for recording said clock pulses and providing an output to said control flip-flop means, operative to change the state thereof;

m. comparator means for comparing a voltage at said integrator means with a predetermined reference voltage and operative to provide an output signal to said clock means preventing the operation thereof when said voltage at said

integrator means reaches said predetermined reference voltage;

n. a plurality of decoder means for decoding said signals recorded in said decade divider means;

o. polarity sensor means for providing an output indication of the polarity of said analog input in response to the relative polarity of the analog signals applied to said floating input terminals; and

p. display means for receiving decoded signals from said decoder means and an output indication of polarity from said polarity sensor, whereby the magnitude and sense of said analog input is presented in digital form by said display.

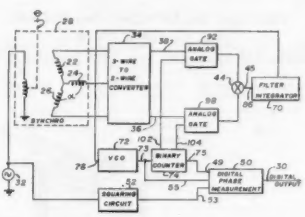
3,878,535
PHASE LOCKED LOOP METHOD OF SYNCHRO-TO-DIGITAL CONVERSION

Frank Twiss, Issaquah, Wash., assignor to Sundstrand Data Control, Inc., Redmond, Wash.

Filed June 8, 1972, Ser. No. 261,021

Int. Cl. H03k *13/02*

U.S. Cl. 340—347 SY **7 Claims**



1. In a system having a primary winding coupled with a source of energization signal and a plurality of secondary windings each having an alternating signal induced therein with an amplitude dependent upon the angular position of said primary winding relative to said secondary windings, a circuit for determining the angular position, comprising:

input means coupled to the plurality of secondary windings for providing at least two alternating input signals carrying amplitude information related to the amplitudes of the alternating signals from the plurality of secondary windings;

controllable oscillator means for generating cyclical signals having a frequency and phase varying in proportion to signals at an error input;

a phase locked loop for controlling the oscillator means to cause the cyclical signals to have a frequency variable in direct proportion with the frequency of the energization signal and a phase directly proportional with said angular position, including

analog gate means coupled to the input means for sampling the alternating input signals to develop sampled signals, means coupling the oscillator means to the analog gate means for causing the analog gate means to sample portions of the alternating input signals in response to the phase of the cyclical signals, and

error means connecting the analog means to the error input for varying the phase of the cyclical signals under control of the sampled signals; and

phase comparator means coupled to the oscillator means and to the source for comparing the relative phase between the cyclical signals and the energization signal to determine said angular position.

3,878,536
APPARATUS FOR IMPROVING THE SHAPE OF CHARACTERS FORMED BY A ROW AND COLUMN COORDINATE MATRIX FOR DISPLAY ON A CATHODE-RAY TUBE

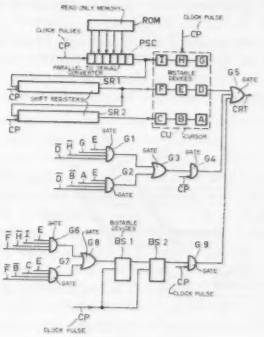
John Elmer Gilliam, Carshalton Beeches, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed July 10, 1972, Ser. No. 270,280

Claims priority, application United Kingdom, July 30, 1971, 36054/71

Int. Cl. G06f *3/14*

U.S. Cl. 340—324 AD **5 Claims**



1. Apparatus for improving the shape of displayed characters for use in a character display system in which the character format is formed by a row and column coordinate matrix and characters to be displayed are built up row-by-row from discrete character elements which are identified within the matrix by character generating data, said apparatus comprising writing means for writing each row of character elements onto a display screen twice in successive line scans of the system, and character lengthening means responsive in respect of each character element, just prior to it being written, for causing that character element when it is written to be lengthened so as to extend into the adjacent element position at one or each side of its own element position when another character element is written in the corresponding adjacent element position in the adjacent preceding character element row or will be written in the corresponding adjacent element position in the adjacent succeeding character element row, but not when another character element is written or will be written, as the case may be, in the element position corresponding to that of the character element concerned in either of the adjacent character element rows and not when a character element is written or will be written in the adjacent element position into which the character element concerned would otherwise extend when lengthened.

3,878,537
MULTIPLEXED LIQUID-CRYSTAL DISPLAY DEVICE

Michel Roncillat, and Michel Hareng, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Apr. 16, 1973, Ser. No. 351,615

Claims priority, application France, Apr. 17, 1972, 72.13441

Int. Cl. G02f *1/18*

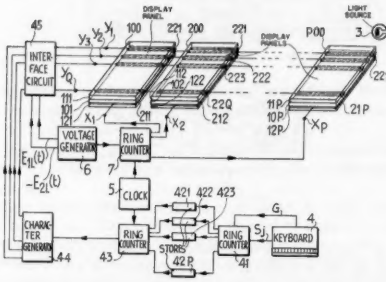
U.S. Cl. 340—324 M **12 Claims**

1. An electrically controlled display device utilising a nematic liquid crystal and comprising:

at least one pair of plates, said pair of plates enclosing a thin film of said liquid crystal;

electrodes positioned on said plates for applying a transverse electrical bias to portions of said film;

means for illuminating said film;
P column and Q row electrical terminals, P and Q being whole numbers greater than unity;
first and second electrical bias means;
each said terminal being directly connected to at least one said electrode;
said first and second bias means being respectively associated with said row and said column terminals;
said second means successively applying to each of said P column terminals a control voltage $E_c(t)$, at a periodicity of T and for a time period of t_1 not exceeding T/P in order to successively raise the potential of said terminals, during said time period and at said periodicity, from a reference electrical potential V_R to an electrical potential $V_R + E_c(t)$;
said first means applying simultaneously to each of said row terminals at least one of the two control voltages $E_{1L}(t)$ and $-E_{2L}(t)$ for causing electrical potential variations of one and the same said row terminal from one to the other



of the two values $V_R + E_{1L}(t)$ and $V_R - E_{2L}(t)$, each said variation, when occuring, being synchronous with the application of said voltage $E_c(t)$ to one of said column terminals;
said control voltages $E_t(t)$, $E_{1L}(t)$ and $E_{2L}(t)$ being capable of varying as a function of time t and having respective peak values E_t, E_{1L} and E_{2L};
said transverse electrical bias applied to a said portion of said film being thus able to change from one to the other of the four values $-E_{L1}(t)$, $E_{L2}(t)$, $E_t(t) - E_{L1}(t)$ and $E_t(t) + E_{L2}(t)$;
said film undergoing changes in magnitude of its optical effect when varying said transverse electrical field applied;
said values $E_{L1}(t)$, $E_{L2}(t)$ and $E_t(t) - E_L(t)$ giving rise to a same first magnitude of said optical effect;
and said value $E_t(t) + E_{L2}(t)$ giving rise to a second magnitude of said optical effect, said second magnitude being higher that said first magnitude.

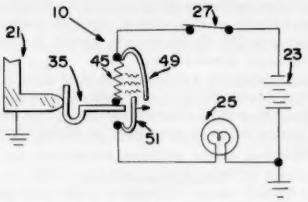
3,878,538

POSITION SENSOR WITH THERMAL TIME DELAY

Nikolaus A. Szeverenyi, and David F. Thompson, both of Warren, Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Apr. 3, 1974, Ser. No. 457,441
Int. Cl. G08b *21/00*
U.S. Cl. 340—282 **15 Claims**

1. A sensor device for providing a time-delayed indication upon the motion of a movable member, said sensor device comprising:
a housing member defining a chamber;
terminal means positioned relative to said chamber and adapted for being engaged by a movable member;
heater means within said chamber and operatively connected to said terminal means, said heater means adapted for providing heat only when said terminal means and said movable member are engaged; and



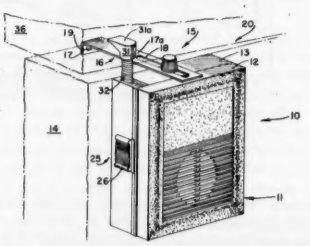
heat responsive means positioned relative to said heater means for receiving heat therefrom, said heat responsive means adapted for responding to said heat for a predetermined time period after said heater means ceases providing heat.

3,878,539

PORTABLE ALARM DEVICE USABLE ON INWARDLY OR OUTWARDLY OPENING DOORS

Chadyeane Gooding, 10500 Rockville Pike, Rockville, Md. 20852

Filed Apr. 19, 1974, Ser. No. 462,416
Int. Cl. G08b *13/08*
U.S. Cl. 340—274 **6 Claims**



1. In a portable, easily securable alarm device adapted to be mounted relative to a door-like surface to provide an indication that said surface has been laterally moved a predetermined distance, said device being of the type which comprises a housing, alarm means secured with said housing, said alarm means comprising a source of electrical energy, a master power switch having an actuating member accessible from outside said housing, a signaling member for emitting a warning signal when actuated, and an alarm actuating member comprising a coiled spring body portion secured at about one end thereof, and acting as an spring-like switch contact in an electrical circuit in said housing which includes said source, said power switch, and said signaling member to actuate said signaling member when said spring body portion is in a first electrical position and said master switch is in a first position for actuating said circuit, said actuating member further including a cap member fixedly secured to the end of said coil arm opposite said end, said cap member having an actuating surface which extends beyond the plane of a mounting surface of said housing to an extent sufficient to disengage said coil arm from a fixed switch contact cooperating with said spring-like contact when said door-like surface is in a closed position, said mounting surface abutting said door-like surface, the improvement comprising means for mounting said housing relative to said door-like surface, said mounting means including a positionable, elongated bracket member having a body portion which includes an elongated slot and a lip portion which extends transversely of said body portion, said mount-

ing means further including means cooperating with said slotted body portion for adjustably securing said bracket member to said housing at any position along said elongated slot so that said lip portion is positioned the desired distance from said mounting surface of said housing.

3,878,540

PAPER FEED STOPPAGE DETECTION MEANS IN AN ELECTRONIC PHOTOCOPYING MACHINE

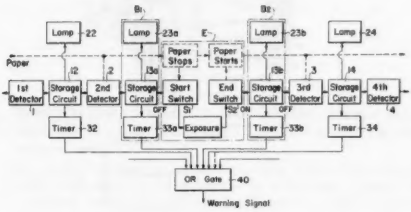
Yoshihisa Kawai, Aichi-ken, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, 541, Japan

Filed Oct. 1, 1973, Ser. No. 402,051

Claims priority, application Japan, Oct. 24, 1972, 47-122862

Int. Cl. G08b *21/00*

U.S. Cl. 340—259 **6 Claims**



1. A paper jam detecting means for use in an electrophotographic copying machine and the like, comprising:

a plurality of detectors located at various points along the path of travel of a sheet of copying paper through said machine, each of said detectors producing an output signal upon detection of passage of a sheet of copying paper;

a plurality of storage circuits, each having set and reset states and producing an output signal only when in the set state, a first of said plurality of storage circuits being set by an input signal supplied thereto at the start of feed of a sheet of copying paper, a first of said plurality of detectors operatively coupled thereto, whereby said first storage circuit is reset by the output of said first detector, a second of said plurality of storage circuits operatively coupled to a detector located at the entrance to an exposure chamber and adapted to be reset by an input signal generated upon the commencement of exposure of a sheet of copying paper, a third of said plurality of storage circuits operatively coupled to a detector located at the exit of the exposure chamber and adapted to be set by a signal generated upon completion of exposure of the sheet of copying paper, the remaining ones of said plurality of storage circuits each operatively coupled to two successive detectors, one detector setting said storage circuit, thereby producing an output signal, the second detector resetting said storage circuit thereof;

a plurality of timers, each coupled to one of said storage circuits and activated by the output thereof, each of said timers producing an output if actuated for more than a predetermined time; and

alarm means coupled to all of said timers and adapted to be actuated by an output signal of any one of said timers.

3,878,541

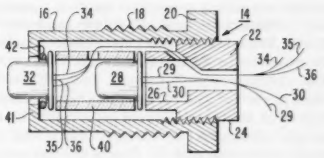
LIQUID LEVEL LIMIT INDICATOR

George Bertram Dodson, III, Shirley, Mass., assignor to RCA Corporation, New York, N.Y.

Filed June 13, 1974, Ser. No. 479,137

Int. Cl. G08b *21/00*

U.S. Cl. 340—244 R **6 Claims**



1. Means for sensing when the level of a liquid in a tank passes a predetermined level, comprising

a reference semiconductor device mounted in said tank with thermal coupling to the tank and the liquid therein, a level-sensing semiconductor device mounted in said tank at said predetermined level and with thermal coupling to air or liquid present in the interior of the tank,

means to supply a current through said reference semiconductor device, and to supply a current through said level-sensing semiconductor device, and

a differential comparator having two inputs each connected to a respective one of said semiconductor devices, and having an output producing an electrical change when the level of liquid passes said predetermined level.

3,878,542

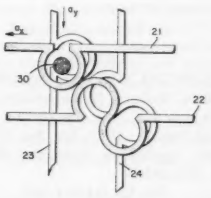
MOVABLE MAGNETIC DOMAIN RANDOM ACCESS THREE-DIMENSIONAL MEMORY ARRAY

Jon H. Myer, Woodland Hills, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Apr. 2, 1974, Ser. No. 457,300

Int. Cl. G11c *11/14*

U.S. Cl. 340—174 TF **5 Claims**



1. In a random access memory device of the type utilizing cylindrical magnetic domains movable in a plane parallel to a major surface of at least one crystal platelet and having a domain positioning magnetic field generating array of electrical conductors positioned in magnetic field coupled relationship to said crystal platelet to define therein an array of binary bit memory locations each of which can store a representation of a binary zero or a binary one, as represented by a selected positioning of one of said movable magnetic domains at a particular portion of said bit location, the improvement comprising:

a. a first set of electrical conductors comprising a plurality of pairs of conductors all extending in spaced parallel relationship to each other in a first direction in a first plane at one major surface of said crystal platelet;

b. a second set of electrical conductors comprising a plurality of pairs of conductors all extending in spaced parallel relationship to each other in a second direction different

from said first direction in a second plane at the major surface of said crystal platelet which is opposite and parallel to said first major surface thereof, one pair of each of said sets of conductors being positioned in magnetic coacting relationship with each of said bit locations and with the pair of conductors in the other set which is positioned to magnetically coact with the same bit location;

c. one conductor of each of said pairs of conductors in each of said sets having at each bit location a reversing double loop portion configured to retain in association with each of said loops at least one of said movable domains with the magnetic field generated by electrical current flowing in a continuous path through each of said loops, said loops at each of said bit locations being connected to the loop of at least one adjacent bit location by at least one straight conductor run which provides with said loops a single continuous path for flow of current and which does not cross any other conductor in its set;

d. the other conductor of each of said pairs of conductors of each of said set having at each of said bit locations a single loop portion configured to retain in association therewith at least one of said movable domains within the magnetic field generated by an electrical current flowing in a continuous path through said loop, said loop at each of said bit locations being connected to the corresponding loop of at least one adjacent bit location by at least one straight conductor run which provides with said loops a single continuous path for flow of current in each of said conductors and which does not cross any other conductor in its set of conductors;

e. each conductor of each of said pairs of conductors being positioned with respect to the other member of said pair of that a single loop of one conductor of the pair and a double loop of the other conductor of a pair are positioned adjacent to each other in each bit location to define three contiguous domain retaining portions of said bit location between which said movable domain may be moved by currents in said conductor arrays, one of said locations representing a stored binary one, a second of said locations representing a stored binary zero, and the third of said locations providing a readout position; and

f. means to supply a drive current to any preselected one of each set of conductors to provide a two ordinate addressable binary memory.

3,878,543

SENSING CIRCUIT FOR USE IN CORE MEMORY

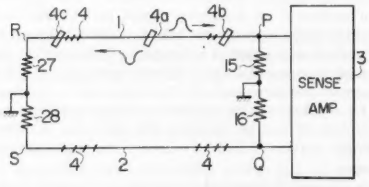
Kazutoshi Yoshida, Mobara, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 21, 1973, Ser. No. 427,127

Claims priority, application Japan, Dec. 29, 1972, 48-3053; Dec. 25, 1972, 48-129269

Int. Cl. G11c *11/06*

U.S. Cl. 340—174 AD **2 Claims**



1. In a sensing circuit for use in a core memory, said sensing circuit comprising:

a pair of sense lines passing through magnetic cores and having near-ends and far-ends;

a sense amplifier connected across the near-ends of said pair of sense lines;

a pair of first termination resistors connected between the near-ends of said sense lines and ground, in which said first termination resistors have a resistance higher than the characteristic impedance of said sense lines, and a pair of second termination resistors connected between said far-ends of said sense lines and ground;

the improvement wherein:

the resistance of said second termination resistors is smaller than the characteristic impedance of said sense lines.

3,878,544

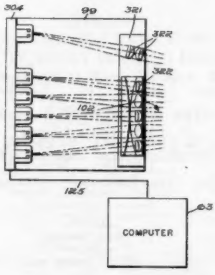
DATA PRINTOUT SYSTEM

John Kent Bowker, Marblehead, Mass., assignor to Itek Corporation, Lexington, Mass.

Division of Ser. No. 181,141, Sept. 3, 1971, Pat. No. 3,778,541. This application May 2, 1973, Ser. No. 356,639

Int. Cl. B41b *15/18*

U.S. Cl. 354—12 **4 Claims**



1. A data printout system comprising:

a radiant energy source means comprising a plurality of flashtubes;

b. a plurality of stroke defining projection lens means for receiving radiant energy from said plurality of flashtubes, said plurality of stroke defining projection lens means being arranged to define a character stroke matrix with each of the stroke defining projection lens means defining a different stroke of said character stroke matrix;

c. information input means for providing a computer data control signal to energize selected ones of said plurality of flashtubes, the radiant energy therefrom being projected by corresponding ones of said plurality of stroke defining projection lens means for forming a desired alphanumeric character;

d. a printout mechanism comprising a photosensitive material; and

e. optical relay means including focusing lens means for receiving the alphanumeric character image beams projected by said stroke defining projection lens means and for relaying said desired character to a predetermined location on said photosensitive material.

3,878,545

REFLEX MEMBER HOLD-DOWN MECHANISM

Arthur Cianci, Norwood, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Apr. 30, 1973, Ser. No. 355,685

Int. Cl. G03b *19/12*

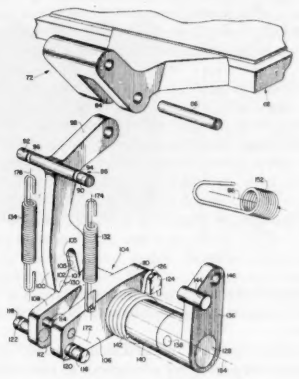
U.S. Cl. 354—152 **7 Claims**

1. In combination with a reflex photographic camera of the type having operator means movable between a viewing position and an exposure position, apparatus including:

erecting means coupled with said operator means and actuable to move said operator means between said viewing and said exposure positions;

actuator means driveably engageable with said erecting means for actuating said erecting means to move said operator means from one of said positions to the other of said positions;

overrride means including energy storage means connected between said actuator means and said erecting means to



permit relative movement between said actuator means and said erecting means upon restraint of said operator means; and

cam means connected to said erecting means and cooperable with said actuator means to releasably secure said operator means in said viewing position against inadvertent movement.

3,878,546

ROLL FILM CAMERA WITH ELECTRICAL FILM FEEDING

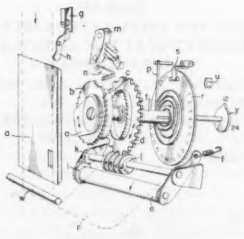
Gunter Adamski, Braunschweig, Germany, assignor to Rollei-Werke Franke & Heidecke, Braunschweig, Germany

Filed Nov. 19, 1973, Ser. No. 417,411

Claims priority, application Germany, Nov. 20, 1972, 2256795

Int. Cl. G03b *19/04*

U.S. Cl. 354—173 **10 Claims**



1. Electrically driven film feeding mechanism for a roll film camera, comprising means forming a guide track for film to be advanced from one exposure position to another, an electric motor for advancing the film, electric circuit means for supplying power to said motor to cause it to operate to advance the film, cam means moved by feeding movement of the film, said cam means having a series of operative portions successively brought to a predetermined position when successive exposure areas of the film arrive successively at exposure position in said guide track, a first switch in said electric circuit means, and means responsive to the position of said cam means for opening said first switch each time that one of said operative portions of said cam means reaches said predetermined position.

3,878,547

SCALE INDICATOR DEVICE IN A ZOOM LENS

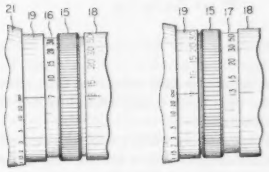
Yozo Iida, Tokyo, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Jan. 31, 1974, Ser. No. 438,407

Claims priority, application Japan, Feb. 5, 1973, 48-15541

Int. Cl. G03b *3/02*

U.S. Cl. 354—198 **1 Claim**



1. A scale indicator device in a zoom lens comprising:

a stationary lens barrel;

a fiirst and a second magnification changing lens frame member slidably mounted within said stationary lens barrel;

an inner cylinder rotatably mounted over said stationary lens barrel so that rotation of said inner cylinder causes sliding movement of one of said magnification changing lens frame members;

an outer cylinder mounted over said inner cylinder for sliding movement with respect thereto and for rotation therewith to cause sliding movement of the other of said magnification changing lens frame members;

an operating ring formed integrally with said outer cylinder and provided with a close-up focusing scale and a zooming scale;

and a cover and an index ring both formed integrally with said stationary lens barrel and positioned outwardly of said close-up focusing scale and said zooming scale respectively;

whereby the close-up focusing scale is concealed by said cover upon rotation of said outer cylinder during the zooming effected by the relative movement of said two frame members, and the zooming scale is concealed by said index ring when said outer cylinder is slidably moved with respect to the inner cylinder to changeover the lens into the close-up focusing function.

3,878,548

CAMERA WITH DETECTION MEANS

Helmut Ettischer, Stuttgart, Germany, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 19, 1973, Ser. No. 417,178

Claims priority, application Germany, Dec. 23, 1972, 7247163

Int. Cl. G03b *19/02*

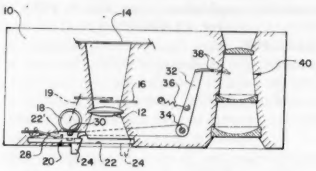
U.S. Cl. 354—268 **4 Claims**

1. In a camera having a taking lens with a field of view, a shutter mechanism, and operable shutter release means for selectively releasing said shutter to effect exposure of film

received at the focal plane of said taking lens; the improvement comprising:

a lens cover movable between an open state uncovering said taking lens and a closed state covering said taking lens;

an abutment surface on said lens cover, said abutment surface being movable with said lens cover in its open state into and out of the path of said shutter release means for selectively disabling said shutter release means;



sensing means on said lens cover for detecting the presence of the operator's finger extending into the camera's field of view; and

means operatively interconnecting said sensing means and said abutment surface for moving said abutment surface into the path of said shutter release means when said sensing means detects the presence of the operator's finger extending into the camera's field of view.

3,878,549

SEMICONDUCTOR MEMORIES

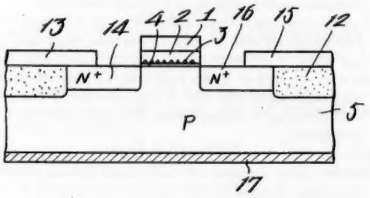
Shumpei Yamazaki, and Yuriko Sugimura, both of c/o Yamazaki Kogyo Kabushiki Kaisha, 9-7 1-chome Shinkawa, Shizuoka, Japan

Continuation-in-part of Ser. No. 187,273, Oct. 7, 1971. This application Sept. 11, 1973, Ser. No. 396,223

Claims priority, application Japan, Oct. 27, 1970, 45-094482; Mar. 30, 1971, 46-018959

Int. Cl. H01l *21/14*

U.S. Cl. 357—23 **9 Claims**



1. A metal-insulator-silicon field effect transistor having an MNCNOS gate structure displaying semiconductor memory characteristics, said MACNOS gate structure comprising:

a semi-conductor substrate having a surface;

at least one first nitride insulating layer disposed on said surface;

at least one semiconductor layer comprising a plurality of clusters of a semiconductor material disposed over said first nitride insulating layer;

at least one second nitride insulating thin-film disposed over said at least one semiconductor layer, said at least one semiconductor layer forming a trap center means for trapping charge carriers such as electrons and holes transmitted thereto during operation of said transistor.

3,878,550

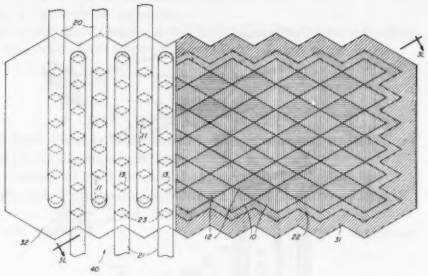
MICROWAVE POWER TRANSISTOR

James A. Benjamin, Boxford, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Oct. 27, 1972, Ser. No. 301,555

Int. Cl. H01l *11/00*

U.S. Cl. 357—36 **8 Claims**



1. A semiconductor device comprising:

a semiconductor planar substrate of a first conductivity type;

a collector region of the said first conductivity type, said collector region being contiguous to said substrate;

a base region of a second conductivity type, said base region being contiguous to said collector region;

a plurality of connections to said base region, said connections being arranged in transverse substantially linear rows and columns;

a plurality of substantially separate emitter regions of said first conductivity type, said emitter regions being contiguous to said base region, said emitter regions being located substantially at the center of four of the said connections to said base region wherein the said four connections are adjacent one another; and

said emitter regions having a substantially diamond shape, the ratio of the length of the junction between each of said emitter regions and said base region at the intersection of said junction with the surface of said semiconductor device to the area of said base region in contact with said collector region divided by the number of said emitter regions being greater than $(5/6)\cdot(1/w)$, w being the linear distance between the two most proximate angles along said junction at said surface.

3,878,551

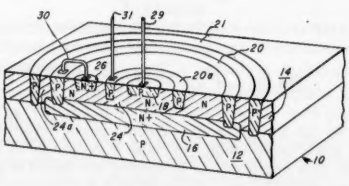
SEMICONDUCTOR INTEGRATED CIRCUITS HAVING IMPROVED ELECTRICAL ISOLATION CHARACTERISTICS

Michael J. Callahan, Jr., Tucson, Ariz., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 30, 1971, Ser. No. 203,353

Int. Cl. H01l *19/00*

U.S. Cl. 357—48 **20 Claims**



1. A semiconductor structure comprising:

a body of monocrystalline semiconductor material including a substrate of one conductivity type and a layer of the opposite conductivity type disposed on said substrate and having an exposed surface,

a heavily doped region of said opposite conductivity type buried within said body, said heavily doped region of said opposite conductivity type being interposed between a portion of said substrate and said layer,

at least one region of said one conductivity type provided in said layer to define a P-N junction therewith, said at least one region being disposed in overlying relation to said heavily doped buried region and extending to the exposed surface of said layer,

at least one isolation region of said one conductivity type provided in said layer and extending from the exposed surface thereof to said heavily doped buried region, said one isolation region being spaced from said substrate by said heavily doped buried region and having a closed geometrical configuration bounding an inner portion of said layer overlying said heavily doped buried region and separating said inner layer portion from an outer laterally adjoining layer portion, and

said heavily doped buried region directly connecting said outer laterally adjoining layer portion to said inner layer portion to provide an electrical path of low resistivity of said opposite conductivity type therebetween.

3,878,552

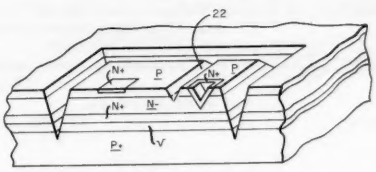
BIPOLAR INTEGRATED CIRCUIT AND METHOD

Thurman J. Rodgers, 271 Leland St., Palo Alto, Calif. 94306

Filed Nov. 13, 1972, Ser. No. 305,983

Int. Cl. H01l *19/00*

U.S. Cl. 357—49 **10 Claims**



1. An integrated circuit including a bipolar semiconductor device comprising a wafer including a highly doped substrate of one conductivity type having its <100> crystallographic planes at one face thereof and three layers of semiconductor material on the entire surface of said one face, said layers comprising in order a lightly doped or intrinsic layer, a highly doped layer, and another layer all of opposite conductivity type, a V-groove extending through said layers into said substrate to define an island, a well extending into said island with a diffusion region of opposite conductivity type formed along the surface thereof to provide electrical connection to said highly doped layer, a diffusion region of one conductivity type extending into said another region, an emitter region of opposite conductivity type formed in said diffusion region, ohmic connections formed with said emitter region, said diffusion region, and said well diffusion region, and another V-groove extending across said island through said diffusion region to isolate said diffusion region from said well diffusion region.

3,878,553

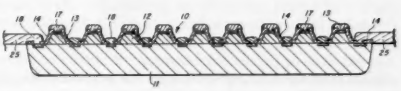
INTERDIGITATED MESA BEAM LEAD DIODE AND SERIES ARRAY THEREOF

Carl Wayne Sirles, Garland, and Barry W. Battershall, Plano, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 26, 1972, Ser. No. 318,078

Int. Cl. H01l *11/00, 15/00*

U.S. Cl. 357—56 **5 Claims**



1. A semiconductor microwave diode device comprising:

a. a substrate of single crystal semiconductor material of one conductivity type having a resistivity in the range of from about 0.001 to about 0.003 ohm-cm.,

b. a plurality of elongated individual mesa areas principally of said one type conductivity material of a resistivity in excess of about 5 ohm-cm. arranged in generally parallel relationship on a major surface of said substrate, each of said mesas having an upper surface region of the opposite type conductivity semiconductor material,

c. a patterned layer of protective insulating material covering said major surface of said substrate and said mesas except for a plurality of elongated areas on the top surfaces of said mesas and a plurality of elongated areas on the surface of said substrate between said mesas and a further area on the surface of said substrate interconnecting by one end said plurality of elongated areas on said substrate,

d. a plurality of electrically conductive metallic layer regions overlying and adhering to said elongated areas of said substrate not covered by said protective insulation and interconnected at one end by an electrically conductive metallic web member adhering to said further area of said substrate and to said protective insulation to form a first multifingered conductive contact member, and

e. a second plurality of electrically conductive metallic layer regions overlying and adhering to the tops of said mesas and interconnected at one end by an electrically conductive web member adhering to said protective insulation to form a second multifingered contact member interdigitated with said first contact member.

3,878,554

SEMICONDUCTOR DEVICE

Koichi Mikome, Yokohama; Yoshihiro Matsuda, and Yoshiyuki Namiki, both of Tokyo, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 237,631, March 24, 1972, abandoned. This application Aug. 27, 1973, Ser. No. 391,758

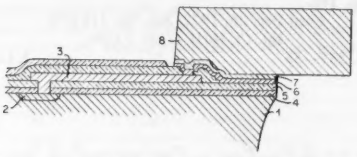
Claims priority, application Japan, Mar. 25, 1971, 46-17535

Int. Cl. H01l *5/00*

U.S. Cl. 357—65 **4 Claims**

1. A semiconductor device comprising a first insulating film covering a surface of a semiconductor substrate; a second insulating film covering the first insulating film; an electrode window penetrating the first and second insulating films to expose a surface region of the semiconductor substrate; a first wiring layer extending from the semiconductor substrate through the electrode window and disposed on the second insulating film; a third insulating film disposed on the first

wiring layer; a second wiring layer disposed on the third insulating film and extending onto the second insulating film; and



a beam lead electrode disposed on the second insulating film and electrically connected to the first wiring layer.

3,878,555

SEMICONDUCTOR DEVICE MOUNTED ON AN EPOXY SUBSTRATE

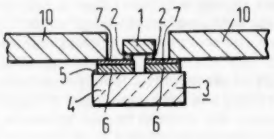
Theodor Freitag; Hanns-Heinz Peltz; Hubert Pretsch, and Detlev Schmitter, all of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin, Germany

Continuation of Ser. No. 142,831, May 11, 1971, abandoned. This application July 18, 1973, Ser. No. 380,161

Claims priority, application Germany, May 14, 1970, 2023680

Int. Cl. H01l *3/00, 5/00*

U.S. Cl. 357—71 **1 Claim**



1. A contact device for joining semiconductor components with a carrier means upon the application of heat comprising a semiconductor body provided with at least two contact spots raised with respect to the remaining surface of the semiconductor body, connecting means for connecting said semiconductor body in electrical circuit relation with said carrier, a substrate of epoxy resin hard paper 0.01 to 0.5 mm. in thickness intermediate said semiconductor body and said carrier; the substrate being lined with a copper film varying from 5 to 20 μ in thickness and having a tin film about 6 μ thick disposed thereon, said tin film joining said carrier and said contact spots to thereby connect said contact spots and said carrier in electrical circuit relationship with respect to one another, the substrate being adapted to join said body and carrier in electrical circuit relation with respect to one another via said contact spots.

3,878,556

MODULARIZED LASER DIODE ASSEMBLY

Paul Nyul, New Holland, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 3, 1973, Ser. No. 403,026

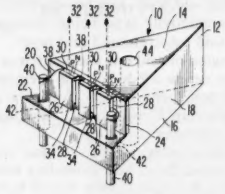
Int. Cl. H01l *3/00, 5/00*

U.S. Cl. 357—81 **15 Claims**

1. A laser diode assembly comprising

a header having a pair of opposed triangularly shaped surfaces and edge surfaces extending between said opposing surfaces, and

at least one laser diode mounted on one of said edge surfaces, said laser diode having therein a PN junction extending substantially parallel to said one edge surface of



said header with the light emitting surface of said laser diode substantially parallel to said triangular surfaces.

3,878,557

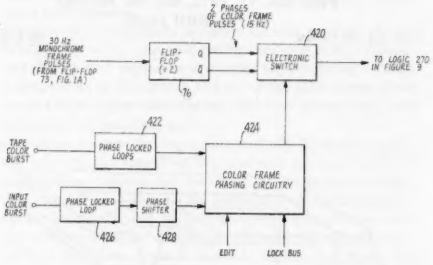
COLOR FRAMING VIDEOTAPE RECORDING APPARATUS AND METHOD

Nikola Vidovic, Santa Clara, Calif., assignor to International Video Corporation, Sunnyvale, Calif.

Filed Mar. 15, 1974, Ser. No. 451,525

Int. Cl. H04n *5/78*

U.S. Cl. 358—4 **9 Claims**



7. In a video tape recorder wherein incoming color video signals having substantially stable horizontal sync to color burst phase are edit recorded adjacent previously recorded color video signals having a substantially stable horizontal sync to color burst phase, said video tape recorder including means for synchronizing in one of two possible phase relationships a signal at the color frame rate of the previously recorded color video signals with a reference signal at the color frame rate derived from the incoming color video signals, the relative phase of the incoming video signals' color burst to the previously recorded video signals' color burst defining the correct phase relationship of said color frame rate signals, color framing apparatus comprising

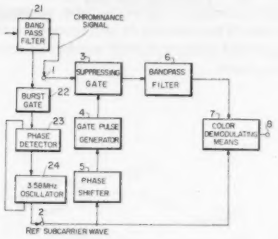
means for comparing the phase relation of the color burst of the incoming color video signals to the color burst of the reproduced previously recorded color video signals to generate a first signal when said phase relation is $\Theta°$ and to generate a second signal when said phase relation is $\Theta + 180°$, and

means for applying said first and second signals to said means for synchronizing to synchronize said color frame rate signals in a first phase relationship in response to said first signal and to synchronize said color frame rate signals in a second phase relationship in response to said second signal.

3,878,558
PHASE COMPENSATING SYSTEM

Seiji Fujisawa, Ikoma; Hiroyuki Irie, Osaka; Tsutomu Kobayashi, Kadoma, and Kosaku Uchida, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 6, 1972, Ser. No. 295,543
Claims priority, application Japan, Oct. 8, 1971, 46-79652; Oct. 31, 1971, 46-86472; Nov. 1, 1971, 46-87047
Int. Cl. H04n *9/12*
U.S. Cl. 358—28 **10 Claims**

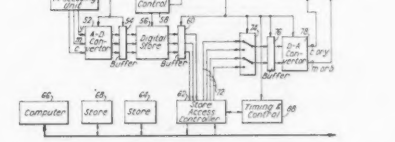


1. A phase compensating system comprising means to supply a phase modulated signal, means to produce a gate signal having a period in an integral multiple relation to the period of a reference carrier signal, a gating means to partly suppress said phase modulated signal to a reference level according to said gate signal, and means to derive a signal phase compensated with respect to a particular phase from the partly suppressed phase modulated signal from said gating means.

3,878,559
COLOUR SCANNERS FOR IMAGE REPRODUCTION

Peter C. Pugsley, Pinner, England, assignor to Crosfield Electronics Limited, London, England

Filed Apr. 30, 1973, Ser. No. 355,672
Claims priority, application United Kingdom, Apr. 28, 1972, 19912/72
Int. Cl. H04n *1/06*
U.S. Cl. 358—75 **4 Claims**



1. A method of preparing colour component separations to make a reproduction of a coloured original comprising the steps of:

scanning the original to derive analogue signals representing the colour component densities of successively scanned points of the original;

converting the said analogue colour-component signals into digital signals;

storing the digital colour-component signals representing the colour-component densities of a line of the original in a store having a capacity less than that required for the storage of colour-component data for the whole of the coloured original;

circumferentially spacing around an output cylinder at least two output surfaces to be treated by a reproducing means to form colour separations, so that they occupy different arcs of the same circumferential track of the output cylinder;

relatively rotating the said output cylinder and the reproducing means so that each output surface in turn is presented to the reproducing means in the course of a single revolution of the said relative rotation and relatively axially displacing the output cylinder and reproducing means to enable the reproducing means to scan the output surfaces in a succession of parallel circumferential lines;

extracting from the store, in a first part of the period of a revolution of the said relative rotation, signals corresponding to the densities in a first colour component of the picture elements in the corresponding scanned line of the original;

controlling the treatment of a line of a first output surface presented to the reproducing means in the said first part of the revolution in accordance with the colour component signals extracted from the store;

extracting from the store, in a second part of the said period of a revolution of the said relative rotation, signals corresponding to the densities in a second colour component of said picture elements in said scanned line of the original;

controlling the treatment of a line of a second output surface presented to the reproducing means in the second part of the said revolution in accordance with the colour component signals extracted from the store in said second part, a line of each of said output surfaces being treated in the period of a single revolution;

erasing from the store said signals used in the control of the treated line of the output surfaces and replacing those signals by colour component signals relating to a subsequently scanned portion of the coloured original, the storing of signals, the relative rotation and relative axial displacement and the erasing of signals from the store being continued until the whole of the coloured original has been scanned and all lines of the output surfaces have been treated;

preparing printing surfaces from the said output surfaces spaced around the output cylinder;

and printing superimposed and registering impressions on a receiving member with the prepared printing surfaces, one after another.

3,878,560
SIGNAL PROCESSING AND REPRODUCING METHOD AND APPARATUS FOR SINGLE VIDEO FRAME REPRODUCTION WITH ASSOCIATED AUDIO

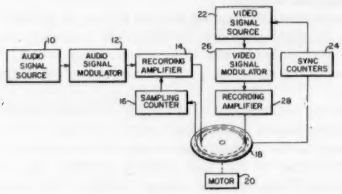
William W. Ramage, Murrysville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 308,895, Nov. 22, 1972. This application Mar. 12, 1974, Ser. No. 450,532
Int. Cl. H04n *5/78*
U.S. Cl. 360—10 **10 Claims**

1. In a television system of the type wherein it is desired to store for retrieval a video signal comprising one frame of a scene together with audio signals which persist for a time period longer than the frame period of said video signal whereby the video signal can be repeated to produce a still picture on a television receiving tube while the audio signal is

demodulated and applied to speaker means; the combination of:

means for sampling said audio signal at a predetermined



rate sufficient to retain substantially all information content of said audio signal,

means for recording said sampled audio signal in interleaved fashion on a track of a first rotatable storage medium in a predetermined number of revolutions of said storage medium,

means for recording said video signal comprising one frame of a scene on another track of said storage medium,

means for transferring the recorded interleaved audio and video signals to tracks on a second rotatable storage medium during one revolution of each of the first and second storage media, and

means for recovering said audio and video signals from the second storage medium and applying them to a speaker means and a television receiving tube, respectively, during a number of revolutions of said second medium corresponding to said predetermined number of revolutions of the first medium.

DESIGNS

APRIL 15, 1975

234,836

HANDLE FOR FENCING ÉPÉE, SABRE, OR FOIL

John H. Culling, 620 N. Taylor Ave., Kirkwood, Mo. 63122, and Emil Stanley St. Pellicer, 6317 Clayton Road, St. Louis, Mo. 63117

Filed Oct. 26, 1973, Ser. No. 410,263

Term of patent 14 years

Int. Cl. D22—*02*

U.S. Cl. D22—1

234,837

HANDLE FOR FENCING ÉPÉE, SABRE, OR FOIL

John H. Culling, 620 N. Taylor Ave., Kirkwood, Mo. 63122, and Emil Stanley St. Pellicer, 6317 Clayton Road, St. Louis, Mo. 63117

Filed Oct. 26, 1973, Ser. No. 410,264

Term of patent 14 years

Int. Cl. D22—*02*

U.S. Cl. D22—1

234,838

HANDLE FOR FENCING ÉPÉE OR FOIL

John H. Culling, 620 N. Taylor Ave., Kirkwood, Mo. 63122, and Emil Stanley St. Pellicer, 6317 Clayton Road, St. Louis, Mo. 63117

Filed Oct. 26, 1973, Ser. No. 410,265

Term of patent 14 years

Int. Cl. D22—*02*

U.S. Cl. D22—1

234,839

HANDLE FOR FENCING ÉPÉE OR FOIL

John H. Culling, 620 N. Taylor Ave., Kirkwood, Mo. 63122, and Emil Stanley St. Pellicer, 6317 Clayton Road, St. Louis, Mo. 63117

Filed Oct. 26, 1973, Ser. No. 410,266

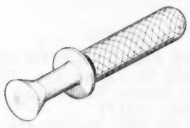
Term of patent 14 years

Int. Cl. D22—*02*

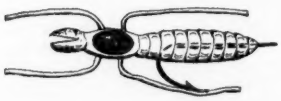
U.S. Cl. D22—1

234,840
COMBINATION HOLSTER, HANDCUFF AND CARTRIDGE CARRIER
Joseph E. Adams, 4244 Mount Vernon Drive, Los Angeles, Calif. 90008
Filed Nov. 19, 1973, Ser. No. 416,728
Term of patent 14 years
Int. Cl. D22—*99*
U.S. Cl. D22—13

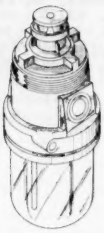
234,841
COMBINATION FISHING ROD AND LINE HOLDER
Robert H. Bojanowski, 14380 Knolson, Livonia, Mich. 48150
Filed Jan. 28, 1974, Ser. No. 436,912
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—25



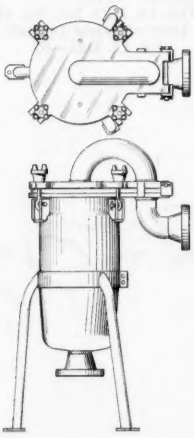
234,842
ARTIFICIAL FISHING LURE
William O. Williams, Jr., 1309 Lynhurst Drive, Gastonia, N.C. 28053
Division and continuation-in-part of design application Ser. No. 239,843, Mar. 30, 1972. Divided and this application Feb. 19, 1974, Ser. No. 443,829
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27



234,843
LUBRICATOR FOR PRESSURIZED FLUID
John C. Taylor, Denver, Colo., assignor to C. A. Norgren Co., Littleton, Colo.
Filed July 17, 1972, Ser. No. 272,164
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—3



234,844
PRESSURIZED LIQUID FILTERING VESSEL OR SIMILAR ARTICLE
Edward A. Smith, Glenville, Conn., assignor to GAF Corporation, New York, N.Y.
Filed Nov. 30, 1972, Ser. No. 310,848
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—4

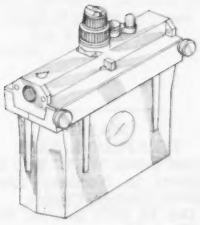


234,845
EXTENSION SPRAY GUN
J. C. Davis, 9818 Hathaway, Dallas, Tex. 75220
Filed Apr. 27, 1973, Ser. No. 354,931
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—17

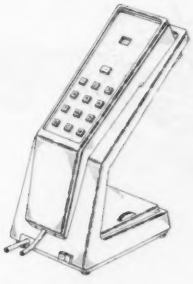
234,846
AIR COCK
Donald A. Gallant, Charlotte, N.C., assignor to Pneumapulse Company, Charlotte, N.C.
Filed Aug. 24, 1972, Ser. No. 283,568
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—19

234,847
PIPE ADAPTER
John J. Hoffman, 1001 N. Brookfield St., South Bend, Ind. 46628
Filed Jan. 12, 1973, Ser. No. 323,124
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—45

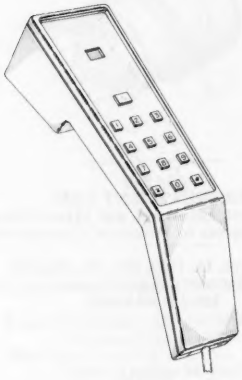
234,848
AIR TREATMENT UNIT
John Vander Horst, Lakewood, and Myron Dunn, Littleton, Colo., assignors to Wilkerson Corporation, Englewood, Colo.
Filed Apr. 16, 1973, Ser. No. 351,803
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—149



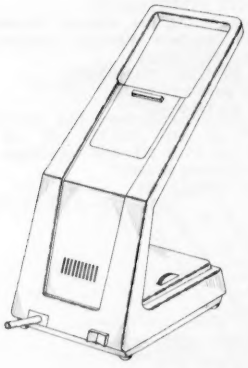
234,849
TELEPHONE INSTRUMENT
John F. Tyson and James W. M. Bee, Ottawa, Ontario, Canada, assignors to Northern Electric Company, Limited, Montreal, Quebec, Canada
Filed Oct. 10, 1973, Ser. No. 405,002
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A



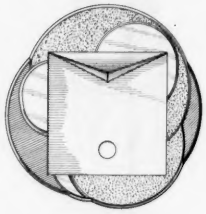
234,850
TELEPHONE HANDSET
John F. Tyson and James W. M. Bee, Ottawa, Ontario, Canada, assignors to Northern Electric Company, Limited, Montreal, Quebec, Canada
Filed Oct. 10, 1973, Ser. No. 405,003
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A



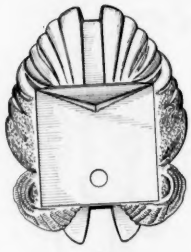
234,851
TELEPHONE BASE
John F. Tyson and James W. M. Bee, Ottawa, Ontario, Canada, assignors to Northern Electric Company, Limited, Montreal, Quebec, Canada
Filed Oct. 10, 1973, Ser. No. 405,004
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A



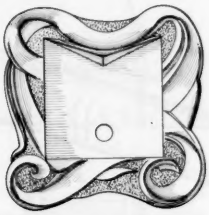
234,852
MEDALLION
Dorothy K. Allen, Libertyville, Ill. (% F. H. Noble & Company, 559 W. 59th St., Chicago, Ill. 60621)
Filed June 28, 1973, Ser. No. 374,765
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D29—19 R



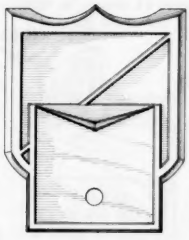
234,853
MEDALLION
Dorothy K. Allen, Libertyville, Ill. (% F. H. Noble & Company, 559 W. 59th St., Chicago, Ill. 60621)
Filed June 28, 1973, Ser. No. 374,766
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D29—19 R



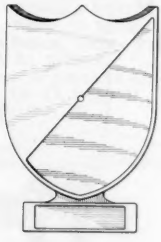
234,854
MEDALLION
Dorothy K. Allen, Libertyville, Ill. (% F. H. Noble & Company, 559 W. 59th St., Chicago, Ill. 60621)
Filed June 28, 1973, Ser. No. 374,767
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D29—19 R



234,855
MEDALLION
Dorothy K. Allen, Libertyville, Ill. (% F. H. Noble & Company, 559 W. 59th St., Chicago, Ill. 60621)
Filed June 28, 1973, Ser. No. 374,768
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D29—19 R

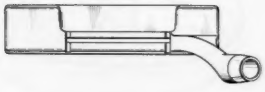


234,856
HERALDIC PLAQUE
Frank N. Allen, Libertyville, Ill. (% F. H. Noble & Company, 559 W. 59th St., Chicago, Ill. 60621)
Filed June 28, 1973, Ser. No. 374,764
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D29—23 A

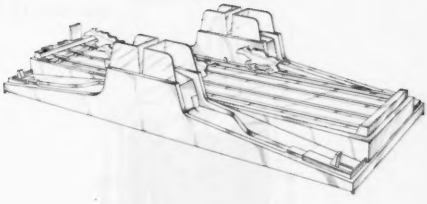


234,857
TOY STUFFED DOG
Thomas J. Dawson, St. Louis, Mo., assignor to Genie Toys, Inc., St. Louis, Mo.
Filed Mar. 22, 1973, Ser. No. 343,823
Term of patent 3½ years
Int. Cl. D21—*01*
U.S. Cl. D34—2 R

234,858
GOLF PUTTER HEAD
Raymon W. Cook, 102 W. Rampart, Apt. P102, San Antonio, Tex. 78216
Filed Sept. 29, 1972, Ser. No. 293,522
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

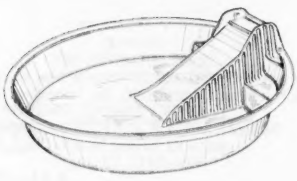


234,859
HORSERACING GAMEBOARD
Gordon A. Barlow, Skokie, Ill., assignor to Marvin Glass & Associates
Filed Dec. 21, 1972, Ser. No. 317,284
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 CC

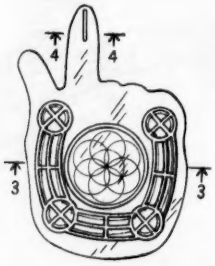


234,860
SET OF CHESS PIECES
Joseph S. Bush, 3751 Glenmeade Road, Louisville, Ky. 40218
Filed Feb. 7, 1973, Ser. No. 330,326
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 CH

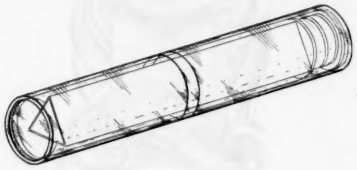
234,861
SLIDE POOL
Ascher Chase, Norfolk, Va., assignor to General Foam Plastics Corp., Norfolk, Va.
Filed July 27, 1973, Ser. No. 383,084
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 F



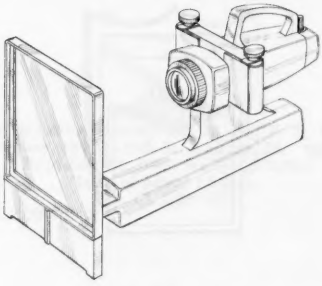
234,862
HAND POINTER FOR A GAME BOARD OR SIMILAR ARTICLE
Jacob B. Burke, 6771 Yellowstone Blvd., Forest Hills, N.Y. 11375, and Ziva G. Rosen, 100 W. 57th St., New York, N.Y. 10019
Filed Aug. 22, 1973, Ser. No. 390,503
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 MM



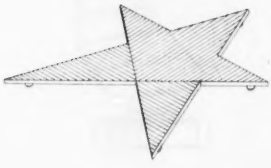
234,863
KALEIDOSCOPE
Judith Karelitz, 430 E. 86th St., New York, N.Y. 10028
Filed May 6, 1971, Ser. No. 141,083
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 A



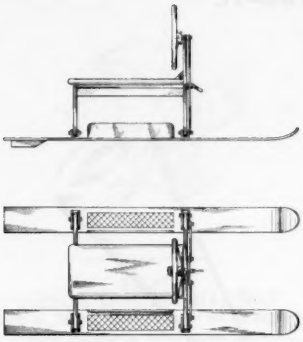
234,864
TOY PROJECTOR
Alan E. Hoeweler and Howard N. Bollinger, Cincinnati, and Terry L. Bernard, Terrace Park, Ohio, assignors to General Mills Fun Group, Inc.
Filed Oct. 11, 1972, Ser. No. 296,722
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 A



234,865
PLATFORM TOY
Walter C. Bolling, 332 Forest Ave., Palo Alto, Calif. 94301
Filed Feb. 12, 1973, Ser. No. 331,504
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



234,866
STEERABLE WATER SKI SLED
William G. Cox III, Albany, Ga.
(410 N. Main St., Dawson, Ga. 31742)
Filed July 6, 1973, Ser. No. 376,989
Term of patent 14 years
Int. Cl. D12—*14*
U.S. Cl. D34—41

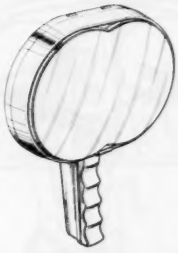


234,867
FINGER RING
Eugene A. Poulin, 85 Royal Oak Road, New Britain, Conn. 06053
Filed Sept. 10, 1973, Ser. No. 395,996
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D45—10 B

234,868
FINGER RING
Eugene A. Poulin, 85 Royal Oak Road, New Britain, Conn. 06053
Filed Sept. 10, 1973, Ser. No. 395,997
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D45—10 B

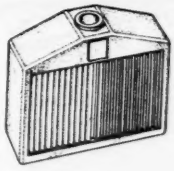
234,869
FINGER RING
Eugene A. Poulin, 85 Royal Oak Road, New Britain, Conn. 06053
Filed Sept. 10, 1973, Ser. No. 395,998
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D45—10 B

234,870
SPOT LIGHT
Arthur Schifrin, Atlantic Beach, N.Y., assignor to Wallfrin La-Cal Industries, Inc., Brooklyn, N.Y.
Filed Jan. 31, 1974, Ser. No. 438,218
Term of patent 14 years
Int. Cl. D26—*03, 02*
U.S. Cl. D48—20 K

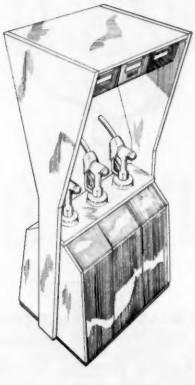


234,871
CIGARETTE LIGHTER
Yoshitaka Nakanishi, 129, 5-chome, Yawata, Ichikawa, Japan
Filed Apr. 12, 1973, Ser. No. 350,486
Claims priority, application Japan Oct. 19, 1972; Nov. 1, 1972
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

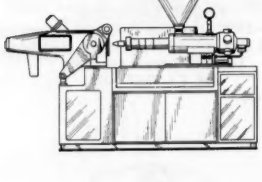
234,872
TABLE LIGHTER
Taro Yanai, 6–15 Ohtemachi 3-chome, Maebashi, Japan
Filed Feb. 19, 1974, Ser. No. 443,344
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—40



234,873
FUEL DISPENSER FOR SERVICE STATIONS
Richard H. Wheeler, Fort Wayne, Ind., assignor to Tokheim Corporation, Fort Wayne, Ind.
Filed May 17, 1973, Ser. No. 361,301
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D52—2 A

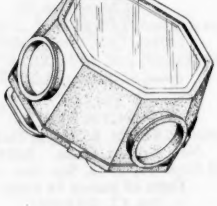


234,874
INJECTION BLOW MOLDING MACHINE
Katashi Aoki, 6037 Oaza Minamijo, Sakaki, Japan
Filed Dec. 14, 1972, Ser. No. 315,136
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D55—1 F

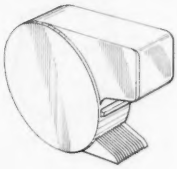


234,875
MUTE FOR A TROMBONE
Samuel Thomas Beversdorf, Bloomington, Ind., assignor to Robert W. Wachtel, doing business as Wachtel Music Products, Columbus, Ohio
Filed Mar. 26, 1973, Ser. No. 344,938
Term of patent 14 years
Int. Cl. D17—*02*
U.S. Cl. D56—1 C

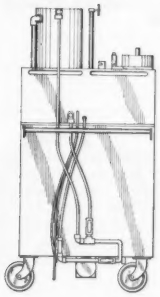
234,876
DAYLIGHT FILM LOADER
Henry F. Hope, 195 Welch Road, Huntingdon Valley, Pa. 19006, and Stephen F. Hope, 2321 Wyandott Road, Willow Grove, Pa. 19090
Filed Jan. 29, 1971, Ser. No. 111,173
Term of patent 14 years
Int. Cl. D16—*99*
U.S. Cl. D61—1 R

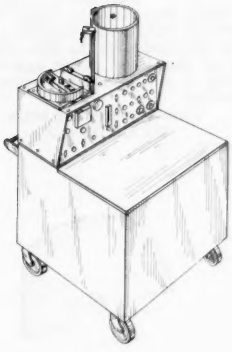


234,877
TAPE DISPENSER
J. Sterling Rose, Denver, Colo., assignor to Birko Chemical Corporation, Denver, Colo.
Filed Aug. 16, 1973, Ser. No. 388,831
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D19—69

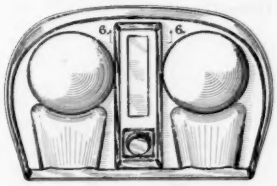


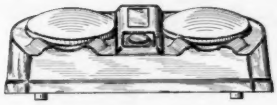
234,878
KIDNEY DIALYSIS MACHINE
Ernest A. Sikes, Cheyenne, Wyo., assignor to Paul V. Horst, Cheyenne, Wyo.
Filed Nov. 13, 1972, Ser. No. 306,165
Term of patent 14 years
Int. Cl. D24—*01, 02*
U.S. Cl. D83—1 F



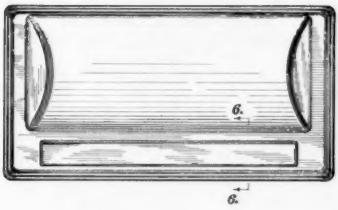


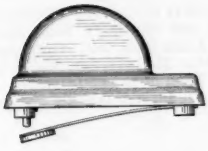
234,879
FOOT MASSAGER
Samuel L. McNair and Henry J. Talge, Overland Park, Kans., assignors to Dazey Products Co.
Filed Feb. 16, 1973, Ser. No. 333,385
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D83—1 S





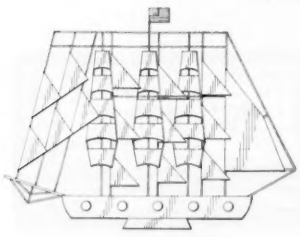
234,880
FOOT MASSAGER
Samuel L. McNair, Overland Park, Kans., assignor to Dazey Products Co.
Filed Feb. 20, 1973, Ser. No. 333,754
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D83—1 S



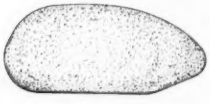


234,881
SHOE POLISHER
Hugo Sanneck, Furth, Bavaria, Gerhard Stettner, Ammerndorf, and Gunther Lunscher, Nuremberg, Germany, assignors to Allgemeine Elektricitats-Gesellschaft, AEG-Telefunken, Berlin, Germany
Filed Jan. 29, 1973, Ser. No. 327,636
Claims priority, application Germany Sept. 8, 1972
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D86—11

234,882
ADVERTISING DISPLAY OR SIMILAR ARTICLE
Leon Goldpaint, 11702 Dunning St., Santa Fe Springs, Calif. 90670
Filed Sept. 20, 1972, Ser. No. 290,705
Term of patent 14 years
Int. Cl. D20—*03*; D11—*02*
U.S. Cl. D96—2 R

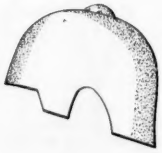


234,883
MOLDED POULTRY PRODUCT
Norman I. Rich and Martin D. Rich, Rock Island, Ill., assignors to Louis Rich, Inc., West Liberty, Iowa
Filed Mar. 23, 1971, Ser. No. 127,437
Term of patent 14 years
Int. Cl. D1—*04*
U.S. Cl. D1—26

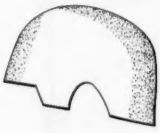


234,884
ATHLETIC SUPPORT OR THE LIKE
Max A. Gulack, 880 5th Ave., New York, N.Y. 10021
Filed June 22, 1973, Ser. No. 372,513
Term of patent 14 years
Int. Cl. D2—*01*
U.S. Cl. D2—11

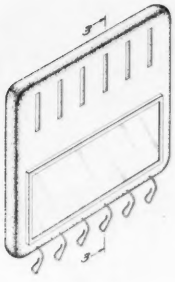
234,885
PROTECTIVE HELMET
George J. Hayes, San Antonio, Tex., and George M. Stewart, Bel Air, Md., assignors to the United States of America as represented by the Secretary of the Army
Continuation of abandoned design application Ser. No. 160,988, July 8, 1971. This application June 7, 1973, Ser. No. 367,930
Term of patent 3½ years
Int. Cl. D2—*03*
U.S. Cl. D2—231



234,886
HELMET
George J. Hayes, San Antonio, Tex., and George M. Stewart, Bel Air, Md., assignors to the United States of America as represented by the Secretary of the Army
Continuation of abandoned design application Ser. No. 160,987, July 8, 1971. This application June 7, 1973, Ser. No. 367,931
Term of patent 3½ years
Int. Cl. D2—*03*
U.S. Cl. D2—231

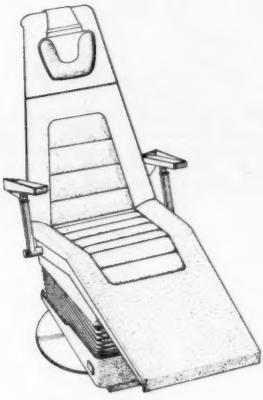


234,887
POCKET CLIP FOR FISHING TACKLE
William S. Stowell, 1114 Bewley, Apt. 4, Santa Ana, Calif. 92703
Filed June 1, 1973, Ser. No. 366,257
Term of patent 14 years
Int. Cl. D2—*99*
U.S. Cl. D2—400



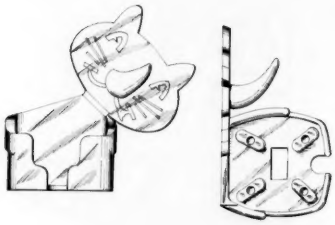
234,888
CHILD'S HIGHCHAIR
Raimo Olavi Simula, Pori, Finland, assignor to Scanbergo, Elis Heinonen, Farsta, Sweden
Filed Aug. 1, 1973, Ser. No. 384,584
Claims priority, application Sweden Feb. 1, 1973
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—8

234,889
DENTAL CHAIR
Lawrence Emmerson House II, Baltimore, Md., and Theodore Prisland, Evanston, Ill., assignors to Litton Medical Products, Inc., Elk Grove Village, Ill.
Filed Mar. 19, 1973, Ser. No. 342,698
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—22

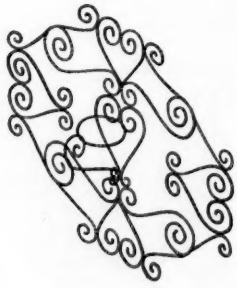


234,890
ROCKING CHAIR
David E. Ohman, Keene, N.H., assignor to Hedstrom Co., Bedford, Pa.
Filed June 7, 1973, Ser. No. 367,741
Term of patent 7 years
Int. Cl. D6—*01*
U.S. Cl. D6—49

234,891
CHILDREN'S TOOTH-BRUSH HOLDER
Harry Thomasson, Paarp, Sweden, assignor to Osmos Plast AB
Filed July 3, 1973, Ser. No. 376,194
Claims priority, application Sweden Jan. 3, 1973
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—92

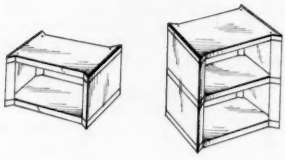


234,892
ORNAMENTAL VASE HOLDER
Barrington Fong, 1711 Davidson Ave., Bronx, N.Y. 10453
Filed Feb. 13, 1974, Ser. No. 442,284
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D6—114

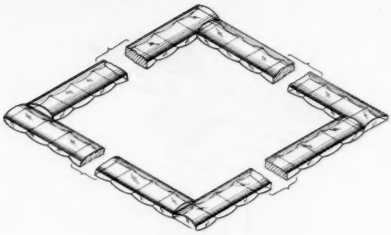


234,893
DISPLAY RACK FOR LUGGAGE TAGS OR THE LIKE
John V. Colan, Warwick, R.I., assignor to Crownmark Corporation, Providence, R.I.
Filed July 23, 1973, Ser. No. 381,670
Term of patent 3½ years
Int. Cl. D20—*02*
U.S. Cl. D6—151

234,894
STORAGE CABINET
Andre Vandenbeuck, Tressin, France, assignor to Intercollection Development SA, Kerchberg, Switzerland
Filed Feb. 14, 1973, Ser. No. 332,341
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—181

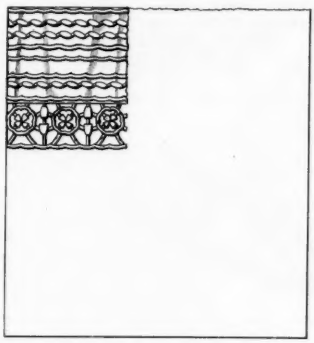


234,895
FRAME
Joseph Bezborodko, 629 Kappok St., New York, N.Y. 10463
Filed Feb. 22, 1973, Ser. No. 334,966
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—242

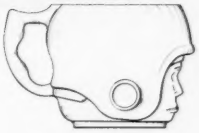


234,896
MIRRORED MOLDING
Joseph Bezborodko, 629 Kappock St., New York, N.Y. 10463
Filed Feb. 22, 1973, Ser. No. 334,965
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—246

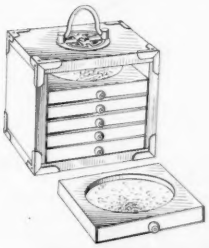
234,897
SHEET
Grace Mazzagatti, Nederland, Tex. (Rte. 4, Box 68–D, Beaumont, Tex. 77705)
Filed June 8, 1973, Ser. No. 368,260
Term of patent 14 years
Int. Cl. D6—*13*
U.S. Cl. D6—264

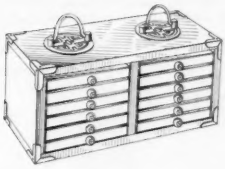


234,898
CUP
Noel L. Merrick, 811 Pawnee Drive, Carmel, Ind. 46032
Filed Apr. 27, 1973, Ser. No. 355,196
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—5



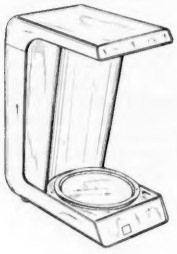
234,899
COMBINED COASTER SET AND HOLDER
Gustav Robert Svensson, Yokohama, Japan, assignor to Julie Pomerantz, Inc., New York, N.Y.
Filed Mar. 12, 1973, Ser. No. 340,260
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—45



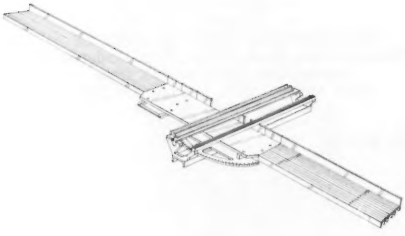


234,900
DECANTER OR SIMILAR ARTICLE
Walter B. Achenbach, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio
Filed Aug. 27, 1973, Ser. No. 391,588
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—52

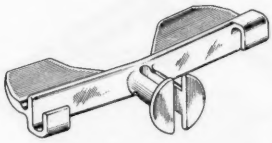
234,901
COFFEE MAKER
Jean Mantelet, Paris, France, assignor to Moulinex Societe Anonyme, Bagnolet, France
Filed May 21, 1973, Ser. No. 362,234
Claims priority, application France Dec. 11, 1972
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—85



234,902
PORTABLE SAW TABLE
Walter G. Marsh, Birmingham, Melvin K. Mercier, Detroit, and James J. Rhoads, Westland, Mich., assignors to Tapco Products Company, Inc., Detroit, Mich.
Filed Mar. 9, 1973, Ser. No. 339,850
Term of patent 14 years
Int. Cl. D8—*99*
U.S. Cl. D8—14

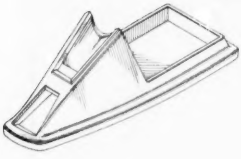


234,903
WIRE OR ROPE TIGHTENER
Albert T. Berg, Jr., and Howard Langlie, both of Ellendale, Minn. 56026
Filed Sept. 27, 1973, Ser. No. 401,347
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—44



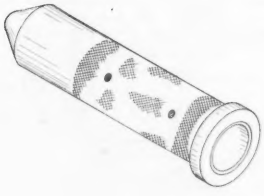
234,904
POWER-DRIVEN KNIFE SHARPENER WITH COVER
Brian Scott Smith, High Wycombe, England, assignor to Tower Housewares Limited, Staffordshire, England
Filed Nov. 15, 1972, Ser. No. 306,808
Claims priority, application Great Britain Aug. 25, 1972
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—63

234,905
SUPPORT STAND FOR A BATTERY OPERATED TOOL
Harold S. Foster, Huntington Beach, Charles J. Ortega, Valencia, and Alvis R. Knowles, Carson, Calif., assignors to Eldon Industries, Inc.
Filed Aug. 27, 1973, Ser. No. 391,790
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—71

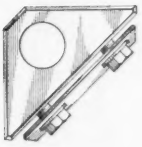


234,906
HAND SAW
Carl-Arne Breger, Malmo, Sweden, assignor to Sandvik Aktiebolag, Sandviken, Sweden
Filed Jan. 10, 1973, Ser. No. 322,352
Claims priority, application Sweden July 10, 1972
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—95

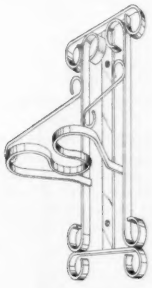
234,907
HAND GRIP FOR BICYCLE OR MOTOR BIKE HANDLE BARS
Eugene M. Jamison, Columbus, Ohio (27640 Gateway Drive E., Farmington, Mich. 48024)
Filed Mar. 8, 1973, Ser. No. 339,416
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D8—138



234,908
REMOVABLE CORNER STRUCTURE FOR SHELVING
Louis Maslow, Dallas, Pa., assignor to Metropolitan Wire Goods Corporation, Wilkes-Barre, Pa.
Filed Oct. 24, 1973, Ser. No. 409,255
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—236

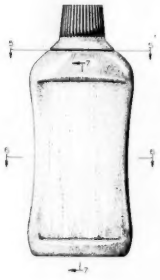


234,909
WALL BRACKET FOR SUPPORTING KEROSENE LAMPS OR THE LIKE
Jerry E. Alexander, Idabel, Okla., assignor to First Step House Incorporated, Idabel, Okla.
Filed Apr. 13, 1973, Ser. No. 351,024
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D8—247

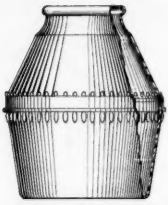


234,910
COMBINED SQUEEZE BOTTLE AND TOOTHBRUSH PACKAGE
Willis W. Sanders, 524 15th St., Santa Monica, Calif. 90402
Filed Aug. 30, 1973, Ser. No. 392,977
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—10

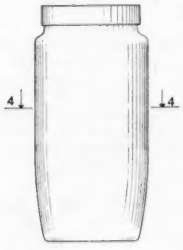
234,911
COMBINED BOTTLE AND CLOSURE THEREFOR OR THE LIKE
Peter P. Stevens, Jr., P.O. Box 95, Point Reyes Station, Calif. 94956
Filed Mar. 21, 1973, Ser. No. 343,292
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—117



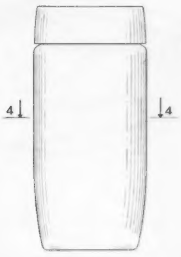
234,912
CONTAINER FOR FLOWABLE MATERIALS OR THE LIKE
Richard E. Roe, Clare, Mich., assignor to Koehring Company
Filed Mar. 16, 1973, Ser. No. 341,967
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—125



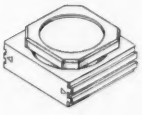
234,913
BOTTLE
Fred Ferdinand Morgan, Blonay, Switzerland, assignor to Societe d'Assistance Technique Pour Produits Nestle S.A., Lausanne, Switzerland
Filed May 14, 1973, Ser. No. 359,622
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—163



234,914
COMBINED BOTTLE AND CAP
Fred Ferdinand Morgan, Blonay, Switzerland, assignor to Societe d'Assistance Technique Pour Produits Nestle S.A., Lausanne, Switzerland
Filed May 14, 1973, Ser. No. 359,648
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—163

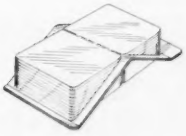


234,915
CONTAINER FOR COSMETICS OR THE LIKE
Joseph J. Freedman, Scarsdale, N.Y., and Suzanne B. Grayson, Englewood, N.J., assignors to Lanvin-Charles of The Ritz, Inc., New York, N.Y.
Filed Nov. 22, 1971, Ser. No. 201,269
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—164

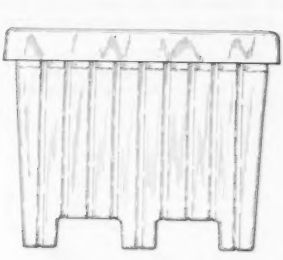


234,916
PACKAGE OF SLICED FOOD OR THE LIKE
Ihor Wyslotsky, 3311 Montmarte Ave., Hazelcrest, Ill. 60429
Filed Jan. 15, 1973, Ser. No. 323,748
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—192

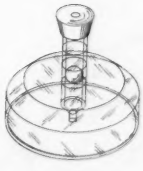
234,917
PACKAGE OF SLICED FOOD OR THE LIKE
Ihor Wyslotsky, 3311 Montmarte Ave., Hazelcrest, Ill. 60429
Filed Jan. 15, 1973, Ser. No. 323,859
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—192



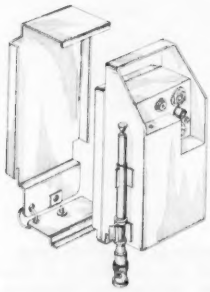
234,918
STORAGE CONTAINER
Norman O. Sauey, Jr., and Robert C. Hazzard, Portage, Wis., assignors to Portage Industries Corporation, Portage, Wis.
Filed Feb. 26, 1973, Ser. No. 336,074
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—219



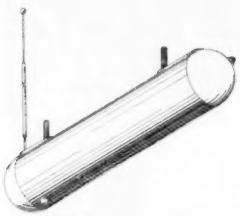
234,919
GAS FLOW INDICATOR
Charles Slama, Peconic, N.Y., assignor to Besenbruch-Hofmann, Inc., Lindenhurst, N.Y.
Filed Sept. 18, 1972, Ser. No. 290,112
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—96



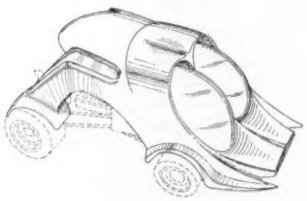
234,920
COMBINED EMERGENCY SIGNAL TRANSMITTER AND RACK THEREFOR
Charles A. Koster, Phoenix, and Wayne E. Perry, Tempe, Ariz., assignors to Aero Electronics Development Co., Inc., Tempe, Ariz.
Filed Apr. 6, 1973, Ser. No. 348,729
Term of patent 14 years
Int. Cl. D29—*02;* D14—*03*
U.S. Cl. D10—106



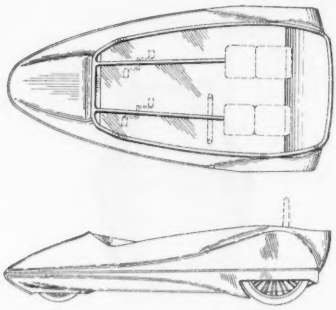
234,921
EMERGENCY SIGNAL TRANSMITTER FOR AIRPLANES OR THE LIKE
Charles A. Koster, Phoenix, and Wayne E. Perry, Tempe, Ariz., assignors to Aero Electronics Development Co., Inc., Tempe, Ariz.
Filed Apr. 6, 1973, Ser. No. 348,730
Term of patent 14 years
Int. Cl. D29—*02;* D14—*03*
U.S. Cl. D10—16



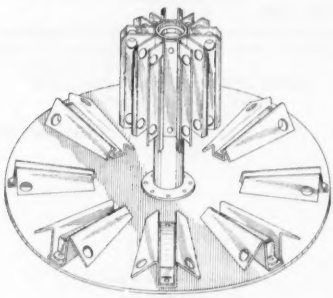
234,922
AUTOMOBILE BODY
Edward Allen Newton, Worthington, Ohio, assignor to Roach Studios, Inc., Worthington, Ohio
Filed Jan. 5, 1973, Ser. No. 321,217
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—86



234,923
THREE-WHEEL VEHICLE
Jerry P. Hepp and Glenn R. Thomas, both of 215 W. Central, Fairview, Okla. 73737
Filed June 25, 1973, Ser. No. 373,538
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—107



234,924
BICYCLE RACK
Wolfram Kurt Tony Seiler, 1151 S. Monaco Parkway, Denver, Colo. 80222
Filed May 29, 1973, Ser. No. 365,026
Term of patent 14 years
Int. Cl. D8—*99*
U.S. Cl. D12—115

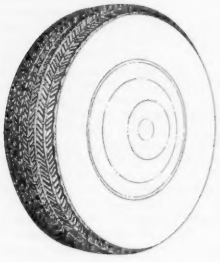


234,925
COMBINED BICYCLE SUPPORT AND LOCK ATTACHING PLATE
Jack D. Kallansrud, 1324 E. Sheridan Ave., Des Moines, Iowa 50316
Filed Jan. 30, 1974, Ser. No. 437,800
Term of patent 7 years
Int. Cl. D8—*08*
U.S. Cl. D12—115

234,926
TIRE

Charles V. Allen, Ann Arbor, Gary R. Penn, South Lyon, and Michael G. Richards and Fraser D. Smithson, Milford, Mich., assignors to General Motors Corporation, Detroit, Mich.

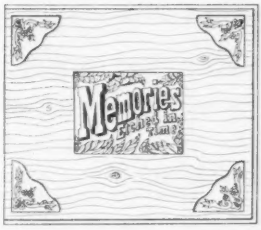
Filed Apr. 2, 1973, Ser. No. 347,235
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—143



234,927
PHOTOGRAPH ALBUM

Bernard John Putt, 28535 Lockdale, Southfield, Mich. 48075

Filed Apr. 25, 1973, Ser. No. 354,166
Term of patent 7 years
Int. Cl. D19—*04*
U.S. Cl. D19—26



LIST OF PATENTEES

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Adelizzi, Richard S., to Westinghouse Electric Corporation. Disc retainer device. 3,877,827, Cl. 403-273.000.

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Ahmed, Adel Abdel Aziz, to RCA Corporation. Stabilization of quiescent collector potential of current-mode biased transistors. 3,878,471, Cl. 330-40.000.

Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Losert, Wolfgang Felix; Loge, Olaf; Schillinger, Ekkehard; Schroder, Eberhard; and Gerhards, Erich. Certain 4-(n-pyrimidin-2-ylsulfamoyl)-phenylacetamides. 3,878,213, Cl. 260-256.50R.

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Alfa Romeo S.p.A.: *See—*
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Allavena, Guido, to Semitex AG. Needle-control mechanism for circular knitting machine. 3,877,255, Cl. 66-13.000.

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Allen, James B.; and Shepherd, Glen C., to Texas Instruments Incorporated. Thermostatic control and switching apparatus. 3,878,498, Cl. 337-347.000.

Allen, Richard C.; and Anderson, V. Brian, to American Hoechst Corporation. Condensed pyrroles bearing an N-phenyl substituent. 3,878,225, Cl. 260-326.12R.

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Ando, Susumu, to Nichicon Capacitor Limited. Electrolytic capacitor vent. 3,878,440, Cl. 317-230.000.

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Bakker, Johannes. Construction toy element. 3,877,170, Cl. 46-23.000.
Balaban, Alvin Reuben, to RCA Corporation. Digital synchronization system. 3,878,335, Cl. 178-69.5TV.
Balaban, Alvin Reuben, to RCA Corporation. Digital synchronizing system. 3,878,336, Cl. 178-69.5TV.
Balch, John T., to Envirotech Corporation. Method and apparatus for distributing feed stock to dryer drum. 3,878,028, Cl. 159-4.0SR.
Balde, John William, to Western Electric Company, Incorporated. Interstage linkage for switching network. 3,878,341, Cl. 179-98.000.
Baldin, Valentin Pavlovich: *See—*
Alexeev, Semen Mikhailovich; Arkhangelsky, Mark Nikolaevich; Baldin, Valentin Pavlovich; Braverman, Boris Solomonovich; Vasiliev, Jury Dmitrievich; Gorjushev, Vladimir Petrovich; Zelvinsky, Alexandr Lvovich; Rogachev, Jury Petrovich; Severin, Gai Ilich; Spassky, Jury Andreevich; Spolitak, Boris Vasilievich; Ushinin, Vladimir Vladimirovich; and Utyamushev, Rustam Ismailovich, 3,877,427.
Baldwin, Mart G., to United States of America, Army. Nitrogen and fluorine containing solid propellant compositions based on acrylic prepolymer binders. 3,878,002, Cl. 149-19.300.
Balle, Gerhard: *See—*
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Bally Manufacturing Corporation: *See—*
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Barfiss, Eugen, to Mahle GmbH. Internal combustion engine piston. 3,877,351, Cl. 92-220.000.
Bargain, Michel; Combet, Andre; and Grosjean, Pierre, to Rhone-Poulenc S.A. Process for preparing heat resistant resin from unsaturated bis-imide and diamine. 3,878,172, Cl. 260-78.0UA.
Bark, Marvin L.: *See—*
Gleason, K. Reed; and Bark, Marvin L., 3,878,008.
Barlow, Thomas M.; and Ruffner, Donald J., to United States of America, Atomic Energy Commission. Cable connector. 3,877,775, Cl. 339-117.00R.
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Barnes, William I., to Stanadyne, Inc. Hydraulic tappet oil metering means. 3,877,445, Cl. 123-90.350.
Barr, Irwin R., to AAI Corporation. Primer. 3,877,375, Cl. 102-45.000.
Barranger, Edwin F.: *See—*
Underwood, Paul; and Barranger, Edwin F., 3,877,671.
Barroza, Herbert. Wheel driving apparatus. 3,877,725, Cl. 280-242.0WC.
Barry, Robert J. Sterile cosmetic suture for attaching hair pieces to scalp and method of packaging and utilizing. 3,877,570, Cl. 206-63.300.
Barth, Hans-Heinrich: *See—*
Wochnowski, Waldemar; Leckband, Uwe; Barth, Hans-Heinrich; and Hohm, Reinhard, 3,877,469.
Barthel, Horst K. F.: *See—*
Miller, George L.; and Barthel, Horst K. F., 3,878,110.
Bartlett, Allen W., to Barnes Engineering Company. Selective emitter offset radiation source for compensating radiation detectors for selective radiation emitted therefrom. 3,878,393, Cl. 250-349.000.
Barton, Edward D.; and Donohue, James M., to Xerox Corporation. Digital power control. 3,878,358, Cl. 219-216.000.
Basf Aktiengesellschaft: *See—*
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Battelle Memorial Institute: *See—*
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Nitzsche, Siegfried; Bauer, Ignaz; Deubzer, Bernward; and Seidel, Wolfgang, 3,878,281.
Bauer, Kurt; Dorr, Wilhelm; Kohler, Alfred; Weber, Martin; and Schmid, Eckhardt, to SWF-Spezzial fabrikfur Autozubehor Gustav Rau GmbH. Windshield wiper blade assembly and wiper blade construction. 3,877,106, Cl. 15-250.420.
Baum, Dennis Willard: *See—*
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Baumann, Bernard: *See—*
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Baumann, Hans; Kriisa, Agu; and Grahn, Hans Erik, to Sonesson Plast AB. Method of preventing corrosion in connection with extrusion of mixtures containing polyvinyl chloride and wood flour or similar cellulosic material, and analogous mixtures containing polystyrene or acrylonitrile-butadiene-styrene resin, respectively. 3,878,143, Cl. 260-17.40R.
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Beloit Corporation: *See—*
Melead, James J., 3,877,857.
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Beneking, Heinz, to Licentia Patent-Verwaltungs-G.m.b.H. Circuit arrangement for driving light emitting semiconductor components. 3,878,406, Cl. 307-304.000.

Benjamin, James A., to Raytheon Company. Microwave power transistor. 3,878,550, Cl. 357-36.000.

Benjamin, Milton L.; and Walker, David D., to Erickson Tool Company. Indexer with diaphragm type disc brake. 3,877,322, Cl. 74-823.000.

Benjamin, Milton L., to Erickson Tool Company. Locking means for adjustable boring bar inserts and the like. 3,877,832, Cl. 408-155.000.

Bensoam, Jean: *See—*
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Berdelle-Hilge, Philipp. Process for controlling the productivity of micro-organisms. 3,878,301, Cl. 426-30.000.

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Berg, Quentin, deceased (by Berg, Frances H., co-executor); and Dauphin Deposit Trust Co., co-executor, to du Pont de Nemours, E. I., and Company. Circuit board socket. 3,877,769, Cl. 339-17.00R.

Bergfeld, Manfred: *See—*
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Bergh, Dustin D.; Titus, Charles H.; and Wittle, J. Kenneth, to General Electric Company. Composite insulating barrier. 3,878,312, Cl. 174-9.00F.

Bergmann, Oswald R.; and Coursen, David L., to du Pont de Nemours, E. I., and Company. Drill-and-blast process. 3,877,373, Cl. 102-23.000.

Bergthaller, Peter: *See—*
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Berkman, Samuel; and Britt, Philip Michael, to RCA Corporation. Method of growing single crystals of compounds. 3,877,883, Cl. 23-301.0SP.

Bernard, Jean-Paul G., to Aerazur Constructions Aeronautiques (Societe Anonyme). Device for braking mobile objects. 3,877,660, Cl. 242-156.000.

Bernau, William, to Universal Manufacturing Co., Inc. Yoke indexing mechanism for toroidal coil-winding machine. 3,877,652, Cl. 242-4.00C.

Bernin, Victor M., to Illinois Tool Works Inc. Accelerometer. 3,877,314, Cl. 73-517.00B.

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Weisstuch, Aaron; and Schell, Charles E., III, 3,878,064.

Bever, James N.; Moore, Earl P., Jr.; and Rusher, Robert L., to du Pont de Nemours, E. I., and Company. Refractory laminate based on negative sol or silicate and positive sol. 3,878,034, Cl. 428-35.000.

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Bhatt, Harshad J. Electrical conductor having a high resistance to electromigration. 3,878,442, Cl. 317-234.00R.

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Biensan, M. Michael; and Potin, M. Philippe, to Societe Aquitaine Total Organico. Process for obtaining high molecular weight polyamides from lactams. 3,878,173, Cl. 260-78.00L.

Biere, Helmut: *See—*
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Bille, Heinz, to Walter Scheele KG, Firma. Concrete pump. 3,877,847, Cl. 417-532.000.

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Bissonet, Claude. Identification bracket. 3,877,163, Cl. 40-16.400.

Biven, Henry B. Position indicator device for vehicle steering wheels. 3,877,410, Cl. 116-31.000.

Bixler, Harris J., to Marine Colloids, Inc. Separation medium. 3,878,100, Cl. 210-198.00C.

Bjor, Hakon Einar; and Hognestad, Harek, to Nortronic A/S and Sentralinstitutt for Industriell. Apparatus for determining signal magnitudes expressing those parameters which indicate how quickly changes take place in a time function. 3,878,382, Cl. 235-183.000.

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Black, John O. Trailer attachment for pick-up truck. 3,877,714, Cl. 280-34.00R.

Blackwell, Jennings P.: *See—*
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Blake, Ralph Kingsley, to du Pont de Nemours, E. I., and Company. Activator solution containing copper (II) ions, halide and a mild oxidizing agent. 3,878,098, Cl. 252-186.000.

Blasina, Lab. Chim. Farm.: *See—*
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Blasina, Pietro; and Molinari, Egidio, to Blasina, Lab. Chim. Farm. Sweet and palatable water soluble derivatives of erythromycin. 3,878,192, Cl. 260-210.00E.

Blaw-Knox Equipment Inc.: *See—*
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Bley, Peter; Ehrfeld, Wolfgang; and Eisenbeiss, Gerd, to Gesellschaft fur Kernforschung mbH. Separation of fluid substances. 3,877,892, Cl. 55-17.000.

Blouin, Glenn M., to Tennessee Valley Authority. Apparatus for applying coatings to solid particles. 3,877,415, Cl. 118-303.000.

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Blum, Alvin S. Electro-mechanical actuator. 3,877,226, Cl. 60-545.000.

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Blush, Jerry F. Attachable extension for an electrical outlet housing. 3,878,315, Cl. 174-57.000.

Blythe, Wayne T.; and Micheizler, Albert J., to United States of America, Army. Digital non-linear frequency control. 3,878,488, Cl. 334-39.000.

Boase, Elmer E.; and Di Fulvio, Anthony P., to Eastman Kodak Company. Pinch roller/capstan web drive. 3,877,627, Cl. 226-33.000.

Bock, Hartmut; Melzer, Werner; Schroeder, Helmut; and Schupmehl, Leo, to Kalle Aktiengesellschaft. Alternating light photometer. 3,877,820, Cl. 356-229.000.

Boden, Karl; and Scheffer, Dietrich, to Padana AG. Electromagnetic bearing means. 3,877,761, Cl. 303-10.000.

Boehme, Hilary, to Atlantic Ultraviolet Corporation. High intensity ultraviolet lamp and method for producing the same. 3,878,421, Cl. 313-220.000.

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Boomstra, Gijsbertus Jan Willem. Rotary disk cutter for a cutter dredge. 3,877,159, Cl. 37-64.000.

Booras, Peter J.; Brenneman, Richard S.; and Lovering, David W., to Yankee Artists, Incorporated. Multicolored reflective article and its manufacture. 3,877,786, Cl. 350-105.000.

Boorstein, William M.; Friedman, Lawrence M.; Rapp, Robert A.; and Oberg, Karl E., to Ohio State University Research Foundation, The. Oxygen exchange with liquid metals. 3,878,073, Cl. 204-140.000.

Borden, George W.; Smith, Oliver W.; and Trecker, David J., to Union Carbide Corporation. Radiation curable compositions of acrylated epoxidized soybean oil amine compounds useful as inks and coatings and methods of curing same. 3,878,077, Cl. 204-159.160.

Borg-Warner Corporation: *See—*
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Bowker, John Kent, to Itek Corporation. Data printout system. 3,878,544, Cl. 354-12.000.

Bowman, Edward W., deceased; by Bowman, Muriel B.; and by Bowman, Michael Edward, executors, to E. W. Bowman Incorporated. Method and apparatus for pre-heating glassware in its passage from the forming machine to the annealing lehr. 3,877,916, Cl. 65-119.000.

Bowman, Michael Edward, executors: *See—*
Bowman, Edward W., deceased; Bowman, Muriel B.; and Bowman, Michael Edward, executors, 3,877,916.

Bowman, Muriel B.: *See—*
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Boyd, Flavil. Process and apparatus for treating human hair. 3,877,471, Cl. 132-9.000.

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Bradley, Gordon Frank; and Price, David, to Ciba-Geigy Corporation. Pigment composition. 3,877,957, Cl. 106-288.00Q.

Bradshaw, Harry; McKenney, Hunter R.; and McKenzie, Roland W., to Standard Forge and Axle Company Incorporated. Method for making brake shoes. 3,877,141, Cl. 29-527.500.

Braly, Edmund A. Buoyancy compensator. 3,877,098, Cl. 9-313.000.

Brandl, Willi; Koula, Zdenek; and Nirk, Peter, to Stotz & Co. Method and apparatus for dampening noise occurring in liquid heaters operating according to the vacuum vaporization principle. 3,877,511, Cl. 165-1.000.

Brandt, Arnold W., to Burroughs Corporation. Current regulator for D.C. motors. 3,878,446, Cl. 318-317.000.

Branscome, Kenneth M.: *See—*
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Bray Oil Company: *See—*
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Breault, Richard V. Carrier for ski equipment. 3,877,623, Cl. 224-45.00S.

Brecker, James N., to Carnegie-Mellon University. Drive systems for a grinding wheel. 3,877,180, Cl. 51-165.900.

Breiling, Edward H.; and Dediemar, Ronald B., to Barber-Greene Company. Apron conveyor for quarry equipment and the like. 3,877,568, Cl. 198-204.000.

Breitschaft, Siegfried, to Hoechst Aktiengesellschaft. Flame-retardant finishing of thermoplasts. 3,878,162, Cl. 260-45.70P.

Breland, Dorothy S. Brush having a head of gathered net material. 3,877,105, Cl. 15-225.000.

Brennan, Edward J.; and Brunelle, Rene J., to Universal Oil Products Company. Center seat forward folding cocktail table for multi-passenger reclining seat unit. 3,877,747, Cl. 297-124.000.

Brenneman, Richard S.: *See—*
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Breslow, David S., to Hercules Incorporated. Polyfunctional quaternary amidoximidinium salts. 3,878,220, Cl. 260-296.00M.

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Brezulova, Elizaveta Andreevna: *See—*
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Brideau, Francis N.; and Dumas, Floyd A., to Acrometal Products, Inc. Apparatus for coating wire filament with liquid. 3,877,414, Cl. 118-234.000.

Brieske, Bernard F., to Vision Wrap Industries, Inc. Method for producing thermoplastic bag with handle. 3,877,352, Cl. 93-35.00H.

Bright, James A., to General Motors Corporation. Pull-out tray for refrigerator shelf. 3,877,767, Cl. 312-337.000.

British Industrial Plastics Limited: *See—*
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Britt, Philip Michael: *See—*
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Broad, Michael John: *See—*
Overy, John; and Broad, Michael John, 3,877,230.

Broadbent, Robert; Melamed, Sidney; and Minton, Robert G., to Rohm and Haas Company. Conductive nylon substrates and method of producing them. 3,877,965, Cl. 427-304.000.

Brock, Reginald L. Severing procedure and apparatus for plastic material. 3,877,625, Cl. 225-2.000.

Broder, Alan; Shapiro, Paul; and Yee, Seening, to United States of America, Navy. Correlation circuit including vernier. 3,878,381, Cl. 235-181.000.

Broemer, Heinz; and Meinert, Norbert, to Ernst Leitz GmbH. Optische Werke. Niobium pentoxide-containing borosilicate glasses. 3,877,953, Cl. 106-54.000.

Broghammer, Werner, to Dual Gebruder Stiedinger, Firma. Displaceable support for an electric indicating device. 3,877,763, Cl. 312-21.000.

Brosene, William G., Jr.: *See—*
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Brouard, Claude Marie Henri Emile; and Ficht, Paulette Gisele, to Produits Chimiques Ugine Kuhlmann. Process for the colourating in bulk of synthetic polyamides. 3,878,158, Cl. 260-37.00N.

Brown, Boveri & Cie A.G.: *See—*
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Brown, Cicero C. Patient lift and exercise apparatus. 3,877,421, Cl. 128-25.00R.
Brown, Donald C. Lift gate assembly. 3,877,590, Cl. 214-75.00T.
Brown, Earle S.: *See—*
Walker, Wellington E.; Brown, Earle S.; and Pruett, Roy L., 3,878,214.
Walker, Wellington E.; Brown, Earle S.; and Pruett, Roy L., 3,878,290.
Walker, Wellington E.; Brown, Earle S.; and Pruett, Roy L., 3,878,292.
Brown, Felix H.; and Hall, Maclin S., to Owens-Illinois, Inc. Display of time-dependent vector information. 3,878,422, Cl. 313-220.000.
Brown, Jerry L., to Westinghouse Electric Corporation. Selective irradiation for fast switching thyristor with low forward voltage drop. 3,877,997, Cl. 148-1.500.
Brown, Kenneth A., to International Telephone and Telegraph Corporation. Orthoscopic image tube. 3,878,329, Cl. 178-7.850.
Brown, Omar L., to Dayton Reliable Tool & Mfg., Co. Easy open ecology end. 3,877,604, Cl. 220-267.000.
Brown, Robert K., Jr., to General Motors Corporation. Inflator for occupant restraint cushion. 3,877,721, Cl. 280-150.0AB.
Brown, Robert L.: *See—*
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Brownscombe, Philip J. Silent ratchet. 3,877,556, Cl. 192-45.100.
Brozek, Chester W., to Chicago Fittings Corporation. Adapter for connecting spirally formed tubing to another conduit. 3,877,734, Cl. 285-249.000.
Bruce Industries, Inc.: *See—*
Petrina, Robert J., 3,878,431.
Bruce, John MacMillan, Jr., to du Pont de Nemours, E. I., and Company. Catalytic conversion of 1,1,2-trichlorotrifluoropropene-1 to 2-chloropentafluoropropene. 3,878,257, Cl. 260-653.400.
Bruinsma, Bote Gosse: *See—*
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Brunelle, Rene J.: *See—*
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Brungsberg, Heinrich-Josef, to Brown, Boveri & Cie A.G. Ignition system for internal combustion engines. 3,877,453, Cl. 123-148.00E.
Brunn, Lynn K.: *See—*
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Brunone, Peter P., to Veeder Industries, Inc. Fluid delivery control and registration system. 3,878,377, Cl. 235-151.340.
Brunosson, Gunnar, to Allmanna Svenska Elektriska Aktiebolaget. Method for hydrostatic extrusion of tubes and billets. 3,877,272, Cl. 72-60.000.
Bruns, Herbert F. Variable air distribution system. 3,877,356, Cl. 98-40.00D.
Bruzzese, Tiberio; and Ferrari, Rodolfo, to SPA-Societa Prodotti Antibiotici S.p.A. 4,4'-Diacyldiphenyl-2-pyridylacetates and derivatives. 3,878,218, Cl. 260-294.80R.
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Bryson, Neil Burton, to Alcon Research and Development Limited. Apparatus with self-centering stool for continuous casting of metals. 3,877,508, Cl. 164-274.000.
Bryzinsky, Frank M.: *See—*
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Bucalo, Louis, to Investors In Ventures, Inc. Implanting method. 3,877,435, Cl. 128-334.00C.
Bucalo, Louis, to Investors In Ventures, Inc. Device for controlling body fluids. 3,877,461, Cl. 128-1.00R.
Bucalo, Louis, to Inventors In Ventures, Inc. Ingrowth shroud and implanting method utilizing the same. 3,877,462, Cl. 128-1.00R.
Buchel, Kurt: *See—*
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Eggert, Walter S., 3,877,748.
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Bumgardner, Donald L.: *See—*
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Bundy, Richard P.; McConnell, Larry D.; and Reigel, Stanley A. Apparatus for separating particulate matter from a gas stream. 3,877,899, Cl. 55-272.000.
Bunker Ramo Corporation: *See—*
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Burch, Darrell E.: *See—*
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Burgess, Ralph D., Jr. Material distributing system for nonfree-flowing products. 3,877,585, Cl. 214-17.0CA.
Burgin, Gerard. Apparatus for dispensing bank notes. 3,877,559, Cl. 194-4.00G.
Burgkhardt, Bertram; Piesch, Ernst; Schrodt, Heinz; Buijs, Klaas; and Vaane, Johannes Pieter, to Gesellschaft fur Kernforschung mbH. Dosimeter to be worn on a finger. 3,878,108, Cl. 250-472.000.
Burke, Harry E. Apparatus and method for compiling and recording operating data on equipment. 3,878,371, Cl. 235-92.0PD.
Burkhard, Frank C., Jr.: *See—*
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Busi, Ettore. Machine for the deposition of measured amounts of softened thermoplastic material into closure caps. 3,877,497, Cl. 141-138.000.
Busigny, Francoise: *See—*
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Busse, Oswald; and Klesper, Hugo, to Passavant-Werke Michelbacher Hutte. Locking means for filter plates in a filter press. 3,878,102, Cl. 210-230.000.
Button, George F.; and Norris, Karl H., to United States of America, Agriculture. Photo-optical method for determining fat content in meat. 3,877,818, Cl. 356-186.000.
Buzbee, Lloyd R.; and Hite, John D., to Koppers Company, Inc. Reflex light reflectors. 3,877,787, Cl. 350-105.000.
Byler, Thomas E.: *See—*
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C.B.M. Enterprises Ltd.: *See—*
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Cahoy, Roger P., to Gulf Research & Development Company. Preemergent chemical control of weeds with N-benzyl-N-isopropylthiobenzamides. 3,877,925, Cl. 71-98.000.
Callahan, Michael J., Jr., to Texas Instruments Incorporated. Semiconductor integrated circuits having improved electrical isolation characteristics. 3,878,551, Cl. 357-48.000.
Campanelli, Tony. Vibratory finishing machine. 3,877,178, Cl. 51-163.000.
Campbell, Douglas D.: *See—*
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Campbell, Mahlon E.; and Walker, William D., to Midwest Research Institute. Polyphenylene sulfide bonded solid film lubricant. 3,878,113, Cl. 252-12.000.
Canada, Atomic Energy of, Limited: *See—*
Sharp, Frederick L.; and Cecco, Valentino S., 3,877,481.
Canada, Her Majesty the Queen in right of, as represented by the Secretary of State: *See—*
O'Donnell, Leopold Henry, 3,877,799.
Cannon, Robert L., to American Optical Corporation. Pacer with self-adjusting output. 3,877,438, Cl. 128-419.0PG.
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Canon Kabushiki Kaisha: *See—*
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Taniguchi, Tadasu, 3,877,177.
Canzler, Rolf, to Schubert & Salzer Maschinenfabrik Aktiengesellschaft. Apparatus for driving and supporting a spinning element. 3,877,212, Cl. 57-100.000.
Cardinal, Felix G.; and Cardinal, Ralph V. System, method and apparatus for processing raw rubber into strip stock for retreading tires. 3,877,655, Cl. 242-67.10R.
Cardinal, Ralph V.: *See—*
Cardinal, Felix G.; and Cardinal, Ralph V., 3,877,655.
Carl Walther Sportwaffenfabrik: *See—*
Keppeler, Dieter, 3,877,167.
Carlberg, George. Method of reclaiming wastes and products therefrom. 3,877,920, Cl. 71-21.000.

Carlson, Elmer A., to International Telephone and Telegraph Corporation. Spark igniter system for gas appliance pilot ignition. 3,877,864, Cl. 431-264.000.

Carlson, Ronald H.; Mesiah, Raymond N.; and Chancey, Harold R., to FMC Corporation. Treatment of aqueous waste streams with hydrogen peroxide to remove chlorinated isocyanurates therefrom. 3,878,208, Cl. 260-248.00A.

Carnegie-Mellon University: *See—*
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Carp, Ralph W.; Miesterfeld, Frederick O.; and Hickner, George B., to Bendix Corporation, The. Latching gate for adaptive braking system. 3,877,755, Cl. 303-21.00P.

Carpenter Technology Corporation: *See—*
Hohl, Francis R.; Meyer, Arthur L., Jr.; and Faust, Robert W., 3,877,283.

Carr, Albert A.; and Kinsolving, Richard, to Richardson-Merrell Inc. Alpha-aryl-4-substituted piperidinoalkanol derivatives. 3,878,217, Cl. 260-293.640.

Carr, John M.; and Mentone, Pat F., to Buckbee-Mears Company. Process for forming solderable coating on alloys. 3,878,065, Cl. 204-40.000.

Carr, Peter: *See—*
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Honnold, Fred V., Jr., 3,877,248.

Carrigan, Tracy, to FMC Corporation. Wheel balancer. 3,877,315, Cl. 73-459.000.

Carroll, George. Device for removing the upper piece from a cut lay. 3,877,695, Cl. 271-18.000.

Carroll, James J., to Warner-Lambert Company. Determination of gamma-glutamyl transpeptidase in biological fluids and diagnostic reagents used therefor. 3,878,048, Cl. 195-99.000.

Carson, Miles Thomas. Vehicle top rack. 3,877,624, Cl. 224-42.10F.

Carter, Thomas H. Building structure. 3,877,186, Cl. 52-82.000.

Carvell, Bernard J.; Sandford, W. Nelson; and Ryan, Robert C., to Zimmerman, C. Michael, a part interest. Tubular deadlock for securing windows and doors closed. 3,877,740, Cl. 292-216.000.

Cary, John D.; and Mikic, Borivoje B., to Massachusetts Institute of Technology. Thermal method and device for the differential diagnosis of human tumors and circulatory disorders. 3,877,463, Cl. 128-2.00H.

Cashen, Norton A.: *See—*
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Castoe, John H. Remote control for automobile accelerator and brake pedals. 3,877,318, Cl. 74-481.000.

Caterpillar Tractor Company: *See—*
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Grawey, Charles E.; Untz, Robert W.; Koch, Keith E.; and Gebhardt, Charles F., 3,877,504.
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Ohms, Edward J.; Stanley, James M.; and Schexnayder, Lawrence F., 3,877,537.
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Catherino, Henry A., to General Electric Company. Rechargeable cell having improved cadmium negative electrode and method of producing same. 3,877,986, Cl. 136-24.000.

Cavallotti, Claudio: *See—*
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Cawley, Richard E.: *See—*
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Cayton, Kenneth; and Reade, Grahame Melvin, to Imperial Chemical Industries Limited. Method and apparatus for filling and sealing plastic containers. 3,877,197, Cl. 53-22.00B.

Cebal GP: *See—*
Cospen, Jean; and Baumann, Bernard, 3,878,018.

Cecchin, Gildo; and Hilbert, Francis H., to Motorola, Inc. Noise processing circuit for a television receiver. 3,878,325, Cl. 178-7.3DC.

Cecco, Valentino S.: *See—*
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Centre Technique de l'Industrie des papiers, Cartons et Celluloses: *See—*
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Cerbo, Thomas A., to Potters Industries, Inc. Apparatus for producing spherical particles. 3,877,918, Cl. 65-142.000.

Cerefice, Steven A.; and Fields, Ellis K., to Standard Oil Company. Diepoxides of 1,2-dihydrophthalate. 3,878,155, Cl. 260-30.40R.

Cerutti, Henry P., to Blaw-Knox Equipment Inc. Spring lock means for connecting abutting form panels. 3,877,674, Cl. 249-196.000.

Champion, Michael John: *See—*
Saunders, Laurie Albert; and Champion, Michael John, 3,877,770.

Champot, Alain, to Ateliers de Construction Metalliques de Caen. Roof composed of multipurpose self-supporting longitudinal elements, method and installation for its manufacture. 3,877,130, Cl. 29-200.00P.

Chancey, Harold R.: *See—*
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Chang, Nuke Ming; and Remkes, Elmer R., to Santa Fe International Corporation. Sea sled for entrenching and pipe burying operations. 3,877,238, Cl. 61-72.400.

Chang, Wen-Hsuan, to PPG Industries, Inc. Safety glass prepared by curing a b-stage polyurethane sheet. 3,878,036, Cl. 428-424.000.

Chapdelaine, Romeo, to Mylec, Inc. Goaltender's protective plastic pads. 3,877,077, Cl. 2-22.000.

Chapman, Charles Brian; and Haldon, Robert Anthony, to Imperial Chemical Industries Limited. Process of producing spot bonded non-woven webs using ultra-violet radiation. 3,878,019, Cl. 156-272.000.

Chappell, Glenn D. Fishing knot tyer. 3,877,737, Cl. 289-17.000.

Charlton, John R., to Hexcel Corporation. Cured epoxy resin compositions useful in the protection of electrical cables. 3,878,146, Cl. 260-18.0PN.

Chase, Zenas E. Variable torque drive mechanism for bicycles. 3,877,724, Cl. 280-241.000.

Chavez, Evelio F., Jr. Pneumatic self-closing valve for a tube of flowable material. 3,877,619, Cl. 222-494.000.

Chemical Additives Company: *See—*
Jackson, Jack M.; and Hartfiel, Arlynn H., 3,878,141.

Chemie Linz Aktiengesellschaft: *See—*
Mayr, Hubert; Presoly, Elfriede; Weinrotter, Ferdinand; Muller, Walter; Stern, Gerhard; and Frohner, Walter Mizzi, deceased, 3,877,923.

Chemische Fabrik Stockhausen & Cie: *See—*
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Chemische Werke Huls Aktiengesellschaft: *See—*
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Chen, Arthur C. M.; and Wang, Jish-Min, to General Electric Company. Method of making a cathode for RF sputtering amorphous semiconducting thin films. 3,877,913, Cl. 65-18.000.

Cheng, Chin Haun, to Dow Chemical Company, The. Dilatometer. 3,877,290, Cl. 73-16.000.

Cheng, Paul J., to Phillips Petroleum Company. Carbon black apparatus. 3,877,876, Cl. 23-259.500.

Chessin, Henry: *See—*
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Chicago Fittings Corporation: *See—*
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Chien, Kuo-Neng: *See—*
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Childs, Willard D.; and Duncan, A. Bruce. Cylinder synchronizer for drilling equipment. 3,877,680, Cl. 254-189.00R.

Childs, Willard D.: *See—*
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Chinn, Leland J., to G. D. Searle & Co. (1S,2S,5S)-2-hydroxy-5-(6-methoxy-2-naphthyl-alpha, alpha, 1- trimethylcyclopentaneethanol. 3,878,251, Cl. 260-613.00R.

Chinu, Yasoyoshi: *See—*
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Chirkov, Veniamin Ivanovich: *See—*
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Chirrick, John M.: *See—*
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Chottiner, Jacob, to Westinghouse Electric Corporation. Catalytic paste and electrode. 3,877,994, Cl. 136-121.000.

Choy, Daniel S. J. Device for advancing material through a tube. 3,877,838, Cl. 417-394.000.

Christensen, Burton G.; and Firestone, Raymond A., to Merck & Co., Inc. Method for the preparation of cephalosporin derivatives. 3,878,203, Cl. 260-243.00C.

Christensen, Svend: *See—*
Jensen, Leo Anker; and Christensen, Svend, 3,877,771.

Christine, William C.; and Watt, William E. R., to General Seating and Sash Company, Inc. Reversible seat. 3,877,746, Cl. 297-95.000.

Cianci, Arthur, to Polaroid Corporation. Reflex member hold-down mechanism. 3,878,545, Cl. 354-152.000.

Ciba-Geigy AG: *See—*
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Nachbur, Hermann; and Maeder, Arthur, 3,878,245.
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Ciba-Geigy Corporation: *See—*
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Dellian, Kurt A.; Weiskopf, Marvin; and Lee, Samuel, 3,877,870.
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Cincinnati Milacron Inc.: *See—*
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Cirino, John F. Blower equipment for roll-over car wash. 3,877,107, Cl. 15-302.000.

Cities Service Company: *See—*
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Clanton, John S.: *See—*
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Clark, Charles W., Jr., to Ederer Incorporated. Restraint apparatus for a mobile structure. 3,877,549, Cl. 188-38.000.

Clark, Fitzhugh T.; and Theodore, David T., to United States of America, Army. Safety and arming mechanism. 3,877,378, Cl. 102-71.000.

Clark, James E.; and Kent, Jerol E., to Clark Kent, Inc. Collapsible container with improved fastener assemblies. 3,877,602, Cl. 220-4.00R.

Clark Kent, Inc.: *See—*
Clark, James E.; and Kent, Jerol E., 3,877,602.

Clark, Trevor P., to C.B.M. Enterprises Ltd. Process of treating wood against stain and decay. 3,877,979, Cl. 427-337.000.

Clayton Manufacturing Company: *See—*
Clayton, William, Sr.; and Cline, Edwin Lee, 3,877,299.

Clayton, William, Sr.; and Cline, Edwin Lee, to Clayton Manufacturing Company. Brake pedal actuator. 3,877,299, Cl. 73-132.000.

Clearwaters, Wanda L.: *See—*
Sloop, Conrad B.; and Clearwaters, Wanda L., 3,877,171.

Cleveland, Jerry R. Electrical filling stop motion. 3,877,493, Cl. 139-374.000.

Cline, Edwin Lee: *See—*
Clayton, William, Sr.; and Cline, Edwin Lee, 3,877,299.

Coakley, Donald L. Car top boat carrier with loader and unloader. 3,877,594, Cl. 214-450.000.

Coates, Clarence A., Jr.; and Weaver, Max A., to Eastman Kodak Company. Azo dye compounds from amino-1,2-benzisothiazolon-1,1-dioxides. 3,878,189, Cl. 260-155.000.

Cobble, Henry R.: *See—*
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Coca-Cola Company, The: *See—*
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Cockman, Haggie I. Sprinkler head and game apparatus. 3,877,644, Cl. 239-118.000.

Cody, John F.; and Sites, George W., to McNeilly, Walter S.; and Bryant, Gerald D., part interest to each. Mowing machine. 3,877,206, Cl. 56-12.800.

Coherent Radiation: *See—*
Heising, Steven James; and Dowley, Mark W., 3,878,479.

Coldren, Larry A.; and Kino, Gordon S., to United States of America, Army. Monolithic acoustic surface wave amplifier device and method of manufacture. 3,877,982, Cl. 427-87.000.

Cole, Michael George; Skoyles, Derek Robert; and Sharp, Denis, to U.S. Philips Corporation. Anti-lock vehicle brake systems. 3,877,760, Cl. 303-21.00F.

Cole, Roger L.: *See—*
Petrick, Michael; Cutting, John C.; Amend, William E.; and Cole, Roger L., 3,878,410.

Coleman, Michael Herder; Hannan, Roland Sydney; and Osborne, David Richard Duke, to Lever Brothers Company. Process for producing cured meats. 3,878,307, Cl. 426-266.000.

Colorado School of Mines Research Institute: *See—*
Morin, Edmond A.; and Peterson, Hal D., 3,878,286.

Colt Industries Operating Corporation: *See—*
Hale, John D., 3,877,532.

Columbia Broadcasting System, Inc.: *See—*
Glenn, William E., Jr., 3,877,777.

Columbus Auto Parts Company, The: *See—*
Andrew, John R.; and McEowen, Victor R., 3,878,355.

Combet, Andre: *See—*
Bargain, Michel; Combet, Andre; and Grosjean, Pierre, 3,878,172.

Combustion Engineering, Inc.: *See—*
Lowrie, Neely E., 3,877,904.
Martucci, John Anthony, 3,878,040.

Comision Para El Aprovechamiento De Aquas Salinas: *See—*
Guerrero, Jesus Martinez, 3,878,104.

Commercial Metals Company: *See—*
Berry, Samuel M., 3,877,850.

Commins, James A. Reclaiming of lime plant fines. 3,878,288, Cl. 423-175.000.

Commonwealth Scientific and Industrial Research Organization: *See—*
Wild, John Paul, 3,878,523.

Communications Satellite Corporation: *See—*
Fariello, Ettore, 3,878,337.
Maillet, Wilfrid G., 3,878,339.

Compagnie Pechiney: *See—*
Mentrier, Michel; and Pichery, Henri, 3,877,811.

Comtelco (U.K.) Limited: *See—*
Hill, John; Turczanski, Henryk; and Wallis, Frederick Henry, 3,878,423.

Concast Incorporated: *See—*
Tegtmeier, Richard J.; Helms, Jimmy L.; and Backhaus, Karl L., 3,877,510.

Concin, Antonio. Thermostat. 3,878,499, Cl. 337-354.000.

Conley, James D.; Belden, Donald E.; and Terhune, Ralph D., to Fram Corporation. System for separating hydrocarbons from water. 3,878,094, Cl. 210-96.000.

Conner, Harold V. Mud flap apparatus for trucks. 3,877,722, Cl. 280-154.000.

Contraves AG: *See—*
Gahwiler, Hermann, 3,878,369.
Heller, Rudolf, 3,877,778.

Conway, William H.: *See—*
KcKenney, John D.; and Conway, William H., 3,877,289.

Cook, Edward H., Jr.; and Emery, Alvin T., to Hooker Chemicals & Plastics Corporation. Electrolytic method for the manufacture of chlorates. 3,878,072, Cl. 204-95.000.

Cook, Edward H., Jr.: *See—*
Schultz, Robert F.; and Cook, Edward H., Jr., 3,878,084.

Cook, Grafton H. Marble laminate structure. 3,878,030, Cl. 428-45.000.

Cook, Ralph L., to Olin Corporation. Protective coating for caseless ammunition. 3,877,374, Cl. 102-38.000.

Cooney, Charles L.: *See—*
Tannenbaum, Steven R.; Weaver, James C.; and Cooney, Charles L., 3,878,049.

Cooper, Duane D., to General Motors Corporation. Steering column assembly. 3,877,319, Cl. 74-492.000.

Corbani, John F., to Sloan Technology Corporation. Cathode sputtering apparatus. 3,878,085, Cl. 204-298.000.

Corcoran, Neal A., Jr., to Owens-Corning Fiberglas Corporation. Supporting system for flanged ceiling tiles. 3,877,190, Cl. 52-484.000.

Cornell, Jack J., to Angeles Metal Trim Co. Tool for forming crimp joints. 3,877,280, Cl. 72-325.000.

Cornell Research Foundation, Inc.: *See—*
Resler, Edwin L., Jr., 3,877,229.
Tannahill, Alex L.; and Finn, Robert K., 3,878,045.

Cornford, Arthur Selwyn, to Aerofall Mills Limited. Partition for tumbling mills or the like. 3,877,650, Cl. 241-71.000.

Corson, Frederick P.: *See—*
Sexton, Arthur R.; and Corson, Frederick P., 3,878,227.

Cospen, Jean; and Baumann, Bernard, to Cebal GP. Method of manufacturing stamping blanks. 3,878,018, Cl. 156-267.000.

Couderc, Pierre; Roussel, Daniel; and Croisier, Jean, to Societe Chimique des Charbonnages C.d.F. Chimie. Telomers, their preparation and their use. 3,878,226, Cl. 260-340.700.

Coursen, David L.: *See—*
Bergmann, Oswald R.; and Coursen, David L., 3,877,373.

Cowen, William, to Ram Partitions Limited. Door latch. 3,877,739, Cl. 292-101.000.

Cox, Arthur; and Johnson, Walter J., to Bell & Howell Company. Short focal length, large aperture optical system. 3,877,792, Cl. 350-189.000.

Cox, Jerry W.; and Wilkes, Mulkey Carl, to PPG Industries, Inc. Reclamation of spent glycol by distillation in the presence of a catalytic amount of alkali metal hydroxide. 3,878,055, Cl. 203-37.000.

Cox, Tom E.: *See—*
McGlothlin, Raymond E.; and Cox, Tom E., 3,878,111.

Cracco, Ruth A.: *See—*
Cracco, Victor J.; and Cracco, Ruth A., 3,877,575.

Cracco, Victor J.; and Cracco, Ruth A. Film tray holder. 3,877,575, Cl. 206-391.000.

Craven, James M., to du Pont de Nemours, E. I., and Company. Composition for increasing the friction of surfaces on ice. 3,878,147, Cl. 260-18.00R.

Creager, Olen R., to International Refrigeration Engineers. Harvest control unit for an ice-making machine. 3,877,242, Cl. 62-138.000.

Cresswell, Ronald M.; and Mentha, John W., to Burroughs Wellcome Co. Ring substituted beta-hydroxy-phenyethylmethyl sulphone or sulphoxide. 3,878,252, Cl. 260-607.00A.

Croisier, Jean: *See—*
Couderc, Pierre; Roussel, Daniel; and Croisier, Jean, 3,878,226.

Crompton & Knowles Corporation: *See—*
Nelson, Howard I., 3,877,492.

Crosfield Electronics Limited: *See—*
Pugsley, Peter C., 3,878,559.

Crowder, Wyly Kenneth. Aquatic vehicles. 3,877,408, Cl. 114-67.00A.

Crozier, David F., to American Manufacturing Company, Inc. Light controlled circuit. 3,878,439, Cl. 317-130.000.

Cuker, Seymour. Power output circuit for electrical discharge machining apparatus. 3,878,437, Cl. 317-33.0VR.

Cullis, Herbert M., to Baxter Laboratories, Inc. Measured dosing dispenser utilizing flow line deformer and method of dispensing. 3,877,609, Cl. 222-1.000.

Culver, Irven H., to Southwestern Industries, Inc. Gear rolling method and apparatus. 3,877,273, Cl. 72-108.000.

Cumming, Raymond C.: *See—*
Wright, Maynard L.; Lehmann, Matt; and Cumming, Raymond C., 3,878,520.

Cummings, Clinton M., to Acme United Corporation. Disposable scalpel handle. 3,877,147, Cl. 30-329.000.

Curran, Robert W.; Dahlin, William F.; and Stearns, Gabriel E., to Aeritalia S.p.A. Translating splitter variable area nozzle and reverser. 3,877,663, Cl. 244-110.00B.

Currell, Herbert Henry; and Bourne, William Colin, to Bond Worth Limited. Pile fabrics and methods and apparatus for the production thereof. 3,878,011, Cl. 156-72.000.

Curulla, Michael V.; Smith, Bart A.; and Ashton, John A., to General Electric Company. Spring and stop assembly for nuclear fuel bundle. 3,878,042, Cl. 176-78.000.

Cutler-Hammer, Inc.: *See—*
Van Zeeland, Donald L.; and Schuchmann, Russell P., 3,878,435.

Cutting, John C.: *See—*
Petrick, Michael; Cutting, John C.; Amend, William E.; and Cole, Roger L., 3,878,410.

Dachs, Karl; Herrle, Karl; Scheuermann, Werner; and Blum, Adolf, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Thickeners for print pastes composed of cross-linked maleic anhydride-alkyl vinyl ether polymers. 3,878,151, Cl. 260-29.60T.

Dadon, Georges: *See—*
Mesnet, Gerard; Dadon, Georges; Le Guennec, Raymond; Remon-Beauvais, Philippe; Pivet, Yann; and Le Luherne, Armand, 3,877,664.

Daghe, Joseph L.; and Stultz, Richard A., to Mueller Co. Valve operator for butterfly valves or the like. 3,877,677, Cl. 251-228.000.

Dahlin, William F.: *See—*
Curran, Robert W.; Dahlin, William F.; and Stearns, Gabriel E., 3,877,663.

Dahmen, Kurt; and Kunschner, Alois, to Chemische Fabrik Stockhausen & Cie. Flame-proofing agents, especially for use with cellulosic materials. 3,877,952, Cl. 106-15.0FP.

Daimler-Benz Aktiengesellschaft: *See—*
Axmann, Franz; and Wahnschaffe, Jurgen, 3,877,454.
Deutschmann, Herbert; Kurczek, Wolfgang; and De Lazzer, Karl-Heinz, 3,877,126.
Scherenberg, Hans O., 3,877,222.
Tank, Eggert; and Pigisch, Franz, 3,877,961.
Wilfert, Karl; and Andres, Rudolf, 3,877,741.

Dalin, Mark Alexandrovich: *See—*
Mekhtiev, Sekhrab Iskenderogly; Dalin, Mark Alexandrovich; Polchaev, Ramis Abdurab Ogly; and Mamedov, Rufat Gadzhibala Ogly, 3,878,238.

Dalzell, Charles J. Solid fuel package. 3,877,886, Cl. 44-40.000.

D'Amato, Salvatore F.; and Foote, Chauncy P., Jr., to American Bank Note Company. Intaglio press with scraper blade apparatus. 3,877,369, Cl. 101-157.000.

Damico, Ralph Anthony; and Boggs, Robert Wayne, to Procter & Gamble Company, The. Fortification of foodstuffs with n-acyl derivatives of sulphur-containing l-amino acids. 3,878,305, Cl. 426-104.000.

Dan, Ervin: *See—*
Guillet, James Edwin; and Dan, Ervin, 3,878,169.

Dana Corporation: *See—*
Wojcikowski, Richard J., 3,877,485.

D'Angelo, Frank. Hair styling device. 3,877,472, Cl. 132-145.000.

Dantani Plywood Co., Ltd.: *See—*
Sadashige, Takeshi, 3,878,016.

Dart Industries Inc.: *See—*
Hartman, Curtis A., 3,877,295.
Montesi, Edward N., 3,877,143.

Data General Corporation: *See—*
Austin, James E. D., 3,878,366.

Dauphin Deposit Trust Co., co-executor: *See—*
Berg, Quentin, deceased; and Dauphin Deposit Trust Co., co-executor, 3,877,769.

D'Auria, Luigi, to Thomson-CSF. Erasable thermoplastic system for the optical storage of data. 3,878,515, Cl. 340-173.0TP.

David, Mack. Method and system for composing musical compositions. 3,877,338, Cl. 84-453.000.

Davies, Robert John; and Blows, Dennis George, to Foster Wheeler John Brown Boilers Limited. Incinerators. 3,877,397, Cl. 110-8.00R.

Davis, Manfred. Body sail. 3,877,406, Cl. 114-39.000.

Davis, Philip S.: *See—*
Hansen, Gerald D.; Varney, Elizabeth G.; and Davis, Philip S., 3,878,037.

Davis, Robert F., to Tapeler Corporation. Apparatus for preparing inventory tickets and labels for use by applying thereto sections of double-faced, pressure-sensitive adhesive tape. 3,878,022, Cl. 156-363.000.

Davis, Stuart M., to ESB Incorporated. Dry cell with corrosion inhibitor. 3,877,993, Cl. 136-107.000.

Davis, Walter C.: *See—*
Hayes, Cecil L.; and Davis, Walter C., 3,877,813.

Dayton Reliable Tool & Mfg., Co.: *See—*
Brown, Omar L., 3,877,604.

Dayton Steel Foundry Company, The: *See—*
Walther, William D.; and DeRegnaucourt, Robert A., 3,877,754.

DCA Food Industries Inc.: *See—*
Meisel, Nicolas M., 3,877,588.

De Laval Separator Company, The: *See—*
Rodger, Keith, 3,877,419.

Dean, Albert G., to Budd Company, The. Stabilizing roll control for pneumatic spring railway car. 3,877,389, Cl. 105-158.00R.

Dean, Raymond Harkless, to RCA Corporation. High frequency device assembly. 3,878,486, Cl. 333-24.00R.

De Cenzo, Herbert A. Connector assembly for terminal junction system. 3,877,772, Cl. 339-74.00R.

Deckert, Helmut; and Jacob, Herbert, to Wacker-Chemie GmbH. Method of polishing semiconductor surfaces. 3,877,183, Cl. 51-283.000.

Dediemar, Ronald B.: *See—*
Breiling, Edward H.; and Dediemar, Ronald B., 3,877,568.

De Franco, Joseph N.: *See—*
Foglietti, Joseph A.; and De Franco, Joseph N., 3,877,264.

Degtyarev, Valery Stepanovich: *See—*
Leonidov, Nikolai Konstaninovich; Levin, Lev Yakovlevich; Ipatov, Petr Platonovich; Krasavtsev, Nikolai Ivanovich; Shtepa, Evgeny Dmitrievich; Gerasimenko, Jury Markovich; Degtyarev, Valery Stepanovich; Rybtsov, Alexandr Fedorovich; Tankin, Anatoly Dmitrievich; Sukhorukov, Alexandr Efimovich; Kovylin, Mikhail Mikhailovich; Markovsky, Jury Lvovich; Ryazanov, Evgeny Makarovich; Altukhov, Vyacheslav Alexeevich; Kononov, Valentin Alexeevich; and Yasakov, Evgeny Ivanovich, 3,877,686.

Dehart, Guy K. Key holder. 3,877,269, Cl. 70-456.00R.

Del Mar Engineering Laboratories: *See—*
McCollum, Fenwick Harris, 3,877,544.

Delalande S.A.: *See—*
Fauran, Claude P.; Eberle, Jeannine A.; Raynaud, Guy M.; and Bailly, Yves J., 3,878,207.

De Lazzer, Karl-Heinz: *See—*
Deutschmann, Herbert; Kurczek, Wolfgang; and De Lazzer, Karl-Heinz, 3,877,126.

Del Fiacco, Mario J., to Schlage Lock Co. Door hold-open device. 3,877,108, Cl. 16-49.000.

Dellian, Kurt A.; Weiskopf, Marvin; and Lee, Samuel, to Ciba-Geigy Corporation. Use of solid carrier for dyeing hydrophobic fibers. 3,877,870, Cl. 8-92.000.

Delta Industries, Inc.: *See—*
Bukaitz, Finley M.; and Neuser, George, 3,877,085.

Delux Australia Ltd.: *See—*
Gillan, John; and Polgar, Livia, 3,878,148.

Demag Aktiengesellschaft: *See—*
Wenzel, Werner; Franke, Friedrich H.; Konig, Horst; and Meraikib, Mohammed, 3,877,868.

Demido, Michael, to General Motors Corporation. Supported line pressure power brake assembly. 3,877,227, Cl. 60-548.000.

Demler, Henry William, Jr.: *See—*
Ziegler, George William, Jr.; and Demler, Henry William, Jr., 3,878,318.

Demler, Henry William, Sr., to AMP Incorporated. Method and device for joining plastic pipe. 3,877,735, Cl. 285-382.100.

Dennison, William T., to United Aircraft Corporation. Turbine rear bearing support structure. 3,877,762, Cl. 308-15.000.

De Nora, Oronzio; Bianchi, Giuseppe; Nidola, Antonio; and Trisoglio, Giovanni, to Electronor Corporation. Anode for oxygen evolution. 3,878,083, Cl. 204-290.00F.

Dental Manufacturing Engineering Limited: *See—*
Killick, Herbert Percy, 3,877,374.

DeRegnaucourt, Robert A.: *See—*
Walther, William D.; and DeRegnaucourt, Robert A., 3,877,754.

Descary, John Gilbert; and Krishnan, Ramamurthy Gopal, to Dominion Engineering Works, Limited. Paper machine headbox having convergent throat portion. 3,878,039, Cl. 162-336.000.

Deschenes, Pierre A.: *See—*
Stephenne, Hubert; Deschenes, Pierre A.; and Busigny, Francoise, 3,878,465.

De Smet, Jean Albert, to Extraction De Smet. Apparatus for separating a mass by filtering into a solid portion and a liquid portion. 3,878,106, Cl. 210-351.000.

Despain, William R.: *See—*
Urssing, Allen H.; Despain, William R.; and Ramos, Henry John, 3,877,474.

Dessauer, Guido: *See—*
Opderbeck, Fritz; Franzen, Volker; and Dessauer, Guido, 3,878,038.

Dettke, Manfred; Fuchs, Karl-Hans; and Ludwig, Rolf. Bath for galvanic deposition of gold and gold alloys. 3,878,066, Cl. 204-43.00G.

Deubzer, Bernward: *See—*
Nitzsche, Siegfried; Bauer, Ignaz; Deubzer, Bernward; and Seidel, Wolfgang, 3,878,281.

Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Keller, Rudolf; Klebe, Hans; and Vollbrecht, Heinz-Rudiger, 3,878,291.
Mannsfeld, Sven-Peter, 3,878,057.

Deutschmann, Herbert; Kurczek, Wolfgang; and De Lazzer, Karl-Heinz, to Daimler-Benz Aktiengesellschaft. Process for the manufacture of line and/or space for receiving or conducting hot gases. 3,877,126, Cl. 29-156.4WL.

Dexter, Martin; and Steinberg, David Herbert. 3,5-dialkyl-4-hydroxyphenyl alkanoic acid esters of 2,4,6-tris(alkanolamino) derivatives of triazine as antioxidants. 3,878,163, Cl. 260-45.8NT.

Dexter, Warren L., to Electra-Bond, Inc. Electrical bonding system for tire recapping. 3,878,023, Cl. 156-394.000.

Dey, Arabinda N.; and Bro, Per, to P. R. Mallory and Co., Inc. Lithium-metal telluride organic electrolyte cell. 3,877,988, Cl. 136-83.00R.

Diana, Guy D.; and Hinshaw, William B., Jr., to Sterling Drug Inc. Aryl substituted tertiary carbinols. 3,878,200, Cl. 260-240.00R.

Dias, J. Fleming; and Karrer, Henry E., to Hewlett-Packard Company. Acoustic surface wave oscillator force-sensing devices. 3,878,477, Cl. 331-40.000.

Dickey, Herbert C., to Ornsteen Chemicals and Textiles Co., Inc. Hot melt cartridge adhesive gun. 3,877,610, Cl. 222-146.0HE.

Dickey-John Corporation: *See—*
Oligschlaeger, Frederick F., 3,877,645.

Diehl, Karl-Heinz: *See—*
Eggensperger, Heinz; Franzen, Volker; Diehl, Karl-Heinz; and Kloss, Wilfried, 3,878,237.

Dietiker, Paul, to Honeywell Inc. Safe lighting gas valve. 3,877,475, Cl. 137-66.000.

Di Fulvio, Anthony P.: *See—*
Boase, Elmer E.; and Di Fulvio, Anthony P., 3,877,627.

Dillon, Brian Douglas: *See—*
Huffaker, James Edward; and Dillon, Brian Douglas, 3,878,020.

Dingwell, Richard A. Incinerators. 3,877,400, Cl. 110-8.00C.

Di Peri, Leonard J. Modular dry-air evaporative cooler. 3,877,244, Cl. 62-314.000.

Diran, Loris M.: *See—*
Pargeter, John K.; Diran, Loris M.; and Hennion, Francis J., 3,877,933.

Distler, Dieter; Wendel, Kurt; Einwiller, Andreas; and Oppenlaender, Knut, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Heat-sensitization of anionic and non-ionic aqueous polymer dispersions. 3,878,152, Cl. 260-29.6XA.

Dix, Robert Wayne, to Lubrizol Corporation, The. Liquid hydrocarbon fuels containing Mannich bases or derivatives thereof. 3,877,889, Cl. 44-73.000.

Dobry, Reuven, to Beech-Nut, Inc. Monellin recovery using carboxymethyl cellulose. 3,878,184, Cl. 260-112.00R.

Dobson, Richard N.; and Webster, Gordon A., to Dominion Foundries Street Limited. Apparatus for the fabrication of structural column members. 3,877,129, Cl. 29-200.00P.

Dr. Ing. h.c.F. Porsche Aktiengesellschaft: *See—*
Scholpp, Werner, 3,877,750.

Dodson, George Bertram, III, to RCA Corporation. Liquid level limit indicator. 3,878,541, Cl. 340-244.00R.

Dokoshi, Noriaki: *See—*
Ikeda, Kojuro; Bairinji, Ryoichi; and Dokoshi, Noriaki, 3,878,109.

Dolbeer, William R.; and Robertson, George N., II. Explosion and fire barrier. 3,877,526, Cl. 169-48.000.

Dolejs, Anthony H.: *See—*
Novak, Frank A.; and Dolejs, Anthony H., 3,877,768.

Dolphin International, Inc.: *See—*
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Dominion Engineering Works, Limited: *See—*
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Randpalu, Adu; Edel, Alfred; Bryce, Rodney Harold; and Bruinsma, Bote Gosse, 3,877,654.

Dominion Foundries Street Limited: *See—*
Dobson, Richard N.; and Webster, Gordon A., 3,877,129.

Domtar Limited: *See—*
Hunt, Ernest G., 3,877,202.

Doner, John T., to Whirlpool Corporation. Heating appliance control panel structure. 3,877,457, Cl. 126-39.00R.

Donjon, Jacques: *See—*
Marie, Gerard J. M.; Donjon, Jacques; LePape, Auguste Raymond; and Monod, Bernard, 3,878,328.

Donkin, Robert G. Centrifugal separator with velocity reducer. 3,877,635, Cl. 233-30.000.

Donohue, James M.; and Fisher, Donald H., to Xerox Corporation. Humidity corrected transfer apparatus. 3,877,416, Cl. 118-637.000.

Donohue, James M.: *See—*
Barton, Edward D.; and Donohue, James M., 3,878,358.

Dormer, Frederic J. Packing for movable machine parts. 3,878,031, Cl. 428-365.000.

Dorosz, Adolph S.; and Williams, Reade, to USM Corporation. Automatically adjustable apparatus for embroidery stitching. 3,877,405, Cl. 112-255.000.

Dorr-Oliver Incorporated: *See—*
Baturay, Allen; and Richards, Harold W., 3,877,488.

Dorr, Wilhelm: *See—*
Bauer, Kurt; Dorr, Wilhelm; Kohler, Alfred; Weber, Martin; and Schmid, Eckhardt, 3,877,106.

Dorrell, Robert F., to Bunker Ramo Corporation. Flat cable connector. 3,877,774, Cl. 339-99.000.

Doty, Donald Judson; and Reavis, Robert Philmore, Jr., to AMP Incorporated. Double-ended conductor-in-slot connecting device. 3,877,773, Cl. 339-97.00P.

Douglas, David. Lighted beverage glass. 3,878,386, Cl. 240-6.40G.

Dover Corporation: *See—*
Hughes, James L.; and Lawrence, James E., 3,877,480.

Dow Chemical Company, The: *See—*
Arnold, Sharon L., 3,877,972.
Beale, Alvin F., Jr., 3,878,199.
Bertram, James L.; and Bowen, David O., 3,878,132.
Cheng, Chin Haun, 3,877,290.
Harty, M. Fillmore, 3,877,087.
Levine, Charles A.; and Tsang, Floris Y., 3,877,995.
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Dow Corning Corporation: *See—*
Atwell, William H.; and Bokerman, Gary N., 3,878,234.

Dowley, Mark W.: *See—*
Heising, Steven James; and Dowley, Mark W., 3,878,479.

Downen, Jim L. Hydraulic drilling jar. 3,877,530, Cl. 175-297.000.

Drapal, Radovan: *See—*
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Dreksler, Moshe Y. Heat exchange coil. 3,877,518, Cl. 165-150.000.

Dresser Industries, Inc.: *See—*
McGlothlin, Raymond E.; and Cox, Tom E., 3,878,111.

Drexhage, Karl H., to Eastman Kodak Company. Mode-locking giant pulse lasers. 3,878,478, Cl. 331-94.5ML.

Drico Industrial Corporation: *See—*
Hansen, Elwood F., 3,877,909.

Driscoll, Richard E., to Cities Service Company. Process of mixing two elastomers. 3,878,153, Cl. 260-29.70D.

Drozdov, Nikolai Andreevich: *See—*
Savcliev, Alexandr Ivanovich; Brezulova, Elizaveta Andreevna; Moskalev, Alexei Gavrilovich; Pavlov, Gely Georgievich; Sharychenkov, Alexandr Alexeevich; Avdeev, Vladimir Vladimirovich; Pastukhov, Valentin Tikhonovich; Ermilov, Grigory Andreevich; Drozdov, Nikolai Andreevich; Radovitsky, Vladimir Petrovich; and Parnev, Vasily Antonovich, 3,877,211.

Druge, Gerard; and LaCombe, Rene, to Societe Anonyme dite: Societe Nouvelle de Roulements. Radiusing dressing apparatus. 3,877,456, Cl. 125-11.00A.

Dual Gebruder Stiedinger, Firma: *See—*
Broghammer, Werner, 3,877,763.

Du Bois, Jean P.: *See—*
Augustine, Robert J.; Du Bois, Jean P.; and Vieceli, Joseph L., 3,878,360.

Ducellier et Cie: *See—*
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Duchatellier, Bernard Charles, to Rapid S.A. Cage nuts. 3,877,342, Cl. 85-75.000.

Dufour, Henri: *See—*
Gobron, Georges; Falize, Claude; and Dufour, Henri, 3,878,249.

Dugge, Richard H.: *See—*
Akester, Roger L.; Dugge, Richard H.; Fossett, Wallace Lee; and Waddell, Jerry D., 3,877,392.

Dumas, Bernard: *See—*
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Dumas, Floyd A.: *See—*
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Duncan, A. Bruce: *See—*
Childs, Willard D.; and Duncan, A. Bruce, 3,877,680.
Louie, Albert; Childs, Willard D.; and Duncan, A. Bruce, 3,877,489.

Dunn, Elman R., to Litton Industries, Inc. Clamping assembly. 3,877,181, Cl. 51-217.00R.

Duntz, John L., Jr., to United States of America, Navy. Low flow gas or liquid calibrator. 3,877,287, Cl. 73-3.000.

Duperow, Donald E., to Lincoln Brass Works, Inc. Gas burner and aeration pan assembly. 3,877,865, Cl. 431-349.000.

du Pont de Nemours, E. I., and Company: *See—*
Berg, Quentin, deceased; and Dauphin Deposit Trust Co., coexecutor, 3,877,769.
Bergmann, Oswald R.; and Coursen, David L., 3,877,373.
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Fukumoto, Juichiro; and Okada, Shigetaka, to Kyowa Hakko Kogyo Kabushiki Kaisha. Process for preparing soluble flavonoid glycosides. 3,878,191, Cl. 260-210.00F.
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Gahwiler, Hermann, to Contraves AG. Method and apparatus for producing a magnitude proportional to the average amplitude of evaluated input pulses of a multiplicity of input pulses. 3,878,369, Cl. 235-92.0PC.
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Gill, Stephen Paschall; and Baum, Dennis Willard, to Artec Associates Incorporated. Explosively driven electric power generation system. 3,878,409, Cl. 310-11.000.

Gillan, John; and Polgar, Livia, to Delux Australia Ltd. Film-farming compositions comprising autoxidizable material. 3,878,148, Cl. 260-22.0EP.

Gilliam, John Elmer, to U.S. Philips Corporation. Apparatus for improving the shape of characters formed by a row and column coordinate matrix for display on a cathode-ray tube. 3,878,536, Cl. 340-324.0AD.

Gimperlein, Werner; and Sedlmayer, Franz, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Gantry loading bridge truck. 3,877,391, Cl. 105-163.00R.

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Girardier, Jean-Pierre; and Parquet, Philippe, to Sofretes-Societe Francaise d'Etudes Thermiques et d'Energie Solaire. Piston engine utilizing a liquefiable gaseous fluid. 3,877,232, Cl. 60-657.000.

Girodin, Mario. Combustion engine with reduced emissions. 3,877,220, Cl. 60-39.630.

Glasscock, Glen C.; and Boyle, Joseph E., to Hubinger Company, The. Process for modifying starch to obtain a thixotropic starch. 3,878,196, Cl. 260-233.30A.

Gleason, K. Reed; and Bark, Marvin L., to United States of America, Navy. Method of forming high reliability mesa diode. 3,878,008, Cl. 156-11.000.

Glenn, William E., Jr., to Columbia Broadcasting System, Inc. Beam expander subsystem for film scanner. 3,877,777, Cl. 350-7.000.

Glenn, William S., Jr. Fluid system. 3,877,524, Cl. 169-17.000.

Glucksman, Dov Z., to Appliance Development Corporation. Electric particle precipitator. 3,877,897, Cl. 55-111.000.

Gobron, Georges; Falize, Claude; and Dufour, Henri, to Rhone-Progil, by said Dufour. Process for producing methacrolein. 3,878,249, Cl. 260-601.00R.

Godfrey, Richard Hugh, to RCA Corporation. Apertured-mask cathode-ray tube having half-tone array of heat-absorbing areas on target surface. 3,878,427, Cl. 313-402.000.

Godot, Jean-Marie, to Essilor International (Compagnie Generale d'Optique). Device for clamping the templet and the workpiece in an outline reproduction machine. 3,877,182, Cl. 51-217.00T.

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Gorski, Raymond W. Flexible frame snowmobile. 3,877,535, Cl. 180-5.00R.

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Greatbatch, Wilson, to Wilson Greatbatch, Ltd. Controlled voltage multiplier providing pulse output. 3,878,450, Cl. 321-15.000.

Green, Franklin L. Combination electrical switch. 3,878,346, Cl. 200-43.000.

Green, John C.; Thausing, Heinrich E.; and May, Edward T., to ACF Industries, Incorporated. Electric in-tank fuel pump. 3,877,845, Cl. 417-424.000.

Greene, Robert Raymond; Jacob, Hans Oscar; and Meece, Meredith Wayne, to International Telephone and Telegraph Corp. Air pumps. 3,877,842, Cl. 417-312.000.

Greenspan, Myron. Method of enlarging images without lenses and display device utilizing the method. 3,877,802, Cl. 353-77.000.

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Groff, Gaylord L. Laminate comprising non-woven fibrous backing. 3,878,316, Cl. 174-68.500.

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Guerrini, Gianpaolo; and Oddicini, Giuseppe, to Ing. C. Olivetti & C., S.p.A. Cartridge for the carbon ribbon of a typewriter, calculating machine, accounting machine or like office machines. 3,877,561, Cl. 197-151.000.

Guhde, Donald Joseph, to Lubrizol Corporation, The. Treatment of metal surfaces with aqueous solution of melamine-formaldehyde composition. 3,877,998, Cl. 148-6.150.

Guillet, James Edwin; and Dan, Ervin. Photodegradable polyesters prepared from ketonic dicarboxylic acids. 3,878,169, Cl. 260-63.00R.

Guinn, Gail Crolley; and Jenny, Joseph W., Jr., to du Pont de Nemours, E. I., and Company. Product and process. 3,878,178, Cl. 260-79.3MU.

Guldenpfennig, Rolf, to Reichhold-Albert-Chemie Aktiengesellschaft. Process for producing water-dilutable coating compositions suitable for electrocoating. 3,878,145, Cl. 260-18.0EP.

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Gunn, Nathaniel I., to Federal Enterprises Inc. Electric incinerator. 3,877,399, Cl. 110-8.00E.

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Gutjahr, Manfred August; Schmid, Rudolf; and Beccu, Klaus Dieter, to Battelle Memorial Institute. Method of manufacturing positive nickel hydroxide electrodes. 3,877,987, Cl. 136-29.000.

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Haas, Leonard L.; and Schlosberg, Seymour, to Philadelphia Gear Corporation. Mechanical seal assembly for glass-lined mixer tanks. 3,877,706, Cl. 277-41.000.

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Hammann, Ernst, to Cincinnati Milacron Inc. Work locating device for grinding machines. 3,877,179, Cl. 51-165.00R.

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Hance, Richard J. Immersion sampler for molten material. 3,877,309, Cl. 73-425.40R.

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Hanka, Ladislav J.; and Martin, David G., to Upjohn Company, The. Process for production of AT-125. 3,878,047, Cl. 195-80.00R.

Hanna, Harry A. Electrostatic field detection method for determining whether apparatus is properly grounded. 3,878,459, Cl. 324-51.000.

Hannan, Roland Sydney: *See—*
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Hansen, Gerald D.; Varney, Elizabeth G.; and Davis, Philip S., to Betz Laboratories, Inc. Method of enhancing the hypochlorite bleaching of pulp. 3,878,037, Cl. 162-73.000.

Hanson, Raymond A. Slipform with longitudinally movable form sections. 3,877,855, Cl. 425-59.000.

Hantscho, Walter G., to George Hantscho Company, Inc. Printing press. 3,877,370, Cl. 101-216.000.

Hara, Koichi: *See—*
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Harada, Motomu, to Nippon Suisan Kabushiki Kaisha. Chain conveyor of swing-stirrup type. 3,877,566, Cl. 198-160.000.

Harakawa, Mototaka, to Star Seimitsu Kabushiki Kaisha (Star Mfg. Co., Ltd.). Electric motor arrangement. 3,878,414, Cl. 310-156.000.

Hardy, John Hesketh Martin, to Post Office, The. Time division multiplex telecommunications systems. 3,878,338, Cl. 179-15.0AT.

Hareng, Michel: *See—*
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Harlin, Lester E., to Borg-Warner Corporation. Vane controlling system for rotary sliding vane compressor. 3,877,853, Cl. 418-88.000.

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Hartman, Curtis A., to Dart Industries Inc. Plastic coated bottle testing system. 3,877,295, Cl. 73-67.200.

Harty, M. Fillmore, to Dow Chemical Company, The. Convertible couch and mechanism therefor. 3,877,087, Cl. 5-13.000.

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Harvey Hubbell Incorporated: *See*—
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Harvey, John S. Atomizing humidifier for central heating systems. 3,877,459, Cl. 126-113.000.

Harwood, James, to SCM Corporation. Acylation of symmetrical diglycerides with fatty acid anhydride. 3,878,231, Cl. 260-410.700.

Hashimoto, Saburo, to Union Oil Company of California. Treatment of animal wastes. 3,878,303, Cl. 426-56.000.

Hassing, Edward J., to MPC Corporation. Furniture structure. 3,877,765, Cl. 312-257.00R.

Haswell, David B.; and Eisenmann, John L., to Process Research, Incorporated. Electrodialysis stack and spacer for use therein. 3,878,086, Cl. 204-301.000.

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Hauser, Fred. Multiple station control timing device. 3,878,345, Cl. 200-38.00R.

Havstad, Harold R., to Hudson Oxygen Therapy Sales Co. Apparatus and method for molding a nasal cannula. 3,877,436, Cl. 128-348.000.

Hawkeye Steel Products, Inc.: *See*—
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Hayashi, Masaki; and Tanouchi, Tadao, to Ono Pharmaceutical Co., Ltd. Prostaglandin D compounds production. 3,878,239, Cl. 260-514.00D.

Hayashi, Torahiko. Automated transfer apparatus. 3,877,563, Cl. 198-31.0AB.

Hayashi, Yasuo; and Miura, Mitsutoshi, to Nippon Kokan Kabushiki Kaisha. Method of producing metallurgical coke. 3,878,052, Cl. 201-20.000.

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Heising, Steven James; and Dowley, Mark W., to Coherent Radiation. Means for regulating vapor pressure in a metal-vapor laser. 3,878,479, Cl. 331-94.50T.

Heisler, Raymond A. Method and apparatus for applying plastic grips to wire bail handles. 3,877,135, Cl. 29-429.000.

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Hekimian, Norris C., to Hekimian Laboratories, Inc. Oscillator having output frequency linearly related to resistance. 3,878,484, Cl. 331-143.000.

Heldenbrand, Stanley W.; Johnson, David L.; and Mote, Neil H., to Seaco Computer-Display Incorporated. Electrostatic viewer-copier apparatus with liquid developing means therefor. 3,877,805, Cl. 355-10.000.

Heller, Rudolf, to Contraves AG. Apparatus for adjusting an optical observation instrument. 3,877,778, Cl. 350-25.000.

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Henkel & Cie GmbH: *See*—
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Hess, Bernhard; and Raichle, Karl, to Bayer Aktiengesellschaft. Curable molding compositions based on unsaturated polyesters and containing acid cellulose esters and polystyrene. 3,878,137, Cl. 260-16.000.

Hess, Daniel J.; and Obenreder, Robert J., to PPG Industries, Inc. Method of and apparatus for detecting concave and convex portions in a specular surface. 3,877,814, Cl. 356-120.000.

Heuser, Gordon D.; and Pennell, Rolla J. Control to limit the reciprocation of the massaging apparatus in a therapeutic manipulating machine. 3,877,422, Cl. 128-57.000.

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High, Carl F. Pressure carburetor system for manifold distribution. 3,877,449, Cl. 123-119.00R.

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Hillesheimer, Walter. Blank punching apparatus. 3,877,336, Cl. 83-512.000.

Hillier, John A., Jr. Furniture module locking device. 3,877,764, Cl. 312-107.000.

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Price, Stephen E.; and Gomm, Thiel J., 3,877,821.
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Ingersoll Milling Machine Company, The: *See—*
Anderson, Alex Lennart, 3,878,353.
Inoue-Japax Research Incorporated: *See—*
Inoue, Kiyoshi, 3,878,352.
Inoue, Kiyoshi. Method of orienting abrasive particles in making abrasive articles. 3,877,891, Cl. 51-293.000.
Inoue, Kiyoshi, to Inoue-Japax Research Incorporated. Electrical discharge machine with evolved-gas detoxification. 3,878,352, Cl. 219-69.00D.
Institut National de Recherche Chimique Appliquee: *See—*
Mathey, Francois; and Bensoam, Jean, 3,878,246.
International Business Machines Corporation: *See—*
Eaton, James H., 3,878,519.
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International Engineering Service, Inc.: *See—*
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Irgens-Bergh, Ib Von, to Potters Industries, Inc. Method and apparatus for making glass spheres. 3,877,914, Cl. 65-21.000.
Irie, Hiroyuki: *See—*
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Irmscher, Klaus; Von Werder, Fritz; Bork, Karl-Heinz; and Kraft, Hans-Guenther, to Merck Patent Gesellschaft mit beschrankter Haftung. Steps for the preparation of 9α-fluoro-16-methylene-prednisolone or -prednisonone and 21-esters thereof. 3,878,228, Cl. 260-397.450.
Irzhavsky, Alexandr Lvovich; Stolyar, Petr Samuilovich; and Shulgin, Konstantin Alexandrovich. Electromechanical disc filter. 3,878,487, Cl. 333-71.000.
ISCO Optische Werke GmbH Gottingen: *See—*
Kulle, Elfriede; and Meyer, Rolf, 3,877,794.
Ishida, Yasuto: *See—*
Tanaka, Kazuaki; Ishida, Yasuto; Sato, Mamoru; Kishimoto, Hidetaka; and Yanagi, Kimiyoshi, 3,878,058.
Ishii, Yasuji. Method of manufacturing a decorative panel having an etched pattern formed thereon. 3,877,958, Cl. 427-262.000.
Ishikawa, Haruhisa: *See—*
Kishi, Emitsu; Shinohara, Osamu; and Ishikawa, Haruhisa, 3,877,576.
Ishizaki, Takuji, to Mitsui Shipbuilding and Engineering Co. Ltd. Discharging means for vessels for storing powder, grain and the like. 3,877,587, Cl. 214-17.00D.
Itakura, Eiji; and Sasaki, Toshiaki, to Japanese National Railways. Method for the continuous detection of vehicle position. 3,877,666, Cl. 246-122.00R.
Itek Corporation: *See—*
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Keller, Juergen H. H.; and Sprague, Robert H., 3,877,937.
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Itoh, Kazu. Neck component in anthropomorphic test dummy. 3,877,156, Cl. 35-17.000.
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Ivy, Jessie T. Expandable boat. 3,877,095, Cl. 9-6.000.
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Kurihara, Takao; Tanaka, Nobuo; Yamagishi, Toru; Nakaoka, Kazuhide; Araki, Kenzi; Iwase, Kozi; and Kubotera, Haruo, 3,877,684.
Iwata, Hiroshi. Electronic flash device with automatic light control. 3,878,429, Cl. 315-151.000.
Iwata, Tadashi. Scaffolding for building. 3,877,543, Cl. 182-133.000.
Iwatsu Electric Co., Ltd.: *See—*
Uchida, Kozo, 3,878,383.
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Jackson, Jack M.; and Hartfiel, Arlynn H., to Chemical Additives Company. Wellbore fluid loss additive composition. 3,878,141, Cl. 260-17.00R.

Jackson, Per-Olof; Juhlin, Lars-Erik; and Ostlund, Brent, to Allmanna Svenska Elektriska Aktiebolaget. Control circuit for a thyristor rectifier. 3,878,448, Cl. 321-11.000.

Jackson, Richard L., to Eli Lilly and Company. Process for purifying insulin. 3,878,186, Cl. 260-112.700.

Jacob, Hans Oscar: *See—*
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Jacob, Herbert: *See—*
Deckert, Helmut; and Jacob, Herbert, 3,877,183.

Jacquelin, Guy, to Centre Technique de l'Industrie des papiers, Cartons et Celluloses. Method for continuous extraction of liquid from a pasty suspension. 3,877,364, Cl. 100-37.000.

Jaffa, David, to Precision Screen Machines Inc. Screen printing lint removing apparatus and method. 3,877,371, Cl. 101-425.000.

Jagenberg-Werke AG: *See—*
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James, George Stephen: *See—*
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James, W. Thomas, III, to Renner Company, The. Towed paver with thickness and leveling control. 3,877,830, Cl. 404-84.000.

Jannello, Francisco Carlos Salvador. Device for lighting cigarettes, for special application in automotors. 3,878,359, Cl. 219-261.000.

Japan Exlan Company Limited: *See—*
Matsumura, Yasuo; and Maruyama, Kunio, 3,878,177.

Japanese Geon Company, Ltd., The: *See—*
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Jasperson, Carl R., Jr. Printed circuit board exposure holding device. 3,877,808, Cl. 355-128.000.

Jefferson Chemical Company, Inc.: *See—*
Moss, Philip Hotchkiss; and Gipson, Robert Malone, 3,878,247.

Jenkins, Lloyd T.; and Ucci, Pompelio A., to Monsanto Company. Antistatic polycarbonamide composition. 3,878,174, Cl. 260-78.00S.

Jenny, Joseph W., Jr.: *See—*
Guinn, Gail Crolley; and Jenny, Joseph W., Jr., 3,878,178.

Jensen, Leo Anker; and Christensen, Svend. Apparatus for the solderless splicing of multi-lead cables. 3,877,771, Cl. 339-19.000.

Jensen, Owen F., Jr. Apparatus for indicating the specific capacity of a well. 3,877,301, Cl. 73-155.000.

Jeromin, Lothar S., to Xerox Corporation. Transfer corona generating device with support brushes. 3,877,417, Cl. 118-637.000.

Jewett, Warren R.; and Mason, William H., to Bio-Gant Corporation. Smoker's filter device. 3,877,470, Cl. 131-261.00B.

Jidosha Kiki Kabushiki Kaisha: *See—*
Masuda, Naosuke; Shimoura, Yoshiyuki; and Konishi, Hideo, 3,877,540.

Jintan Terumo Co., Ltd.: *See—*
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Joanell Laboratories, Inc.: *See—*
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Johannsen, Kenneth L. Retractable bicycle training wheels. 3,877,727, Cl. 280-301.000.

Johnson, David L.: *See—*
Heldenbrand, Stanley W.; Johnson, David L.; and Mote, Neil H., 3,877,805.

Johnson, Donald L.: *See—*
Edelman, Andrew J., 3,877,595.

Johnson, Fredrick A.: *See—*
Maziarka, Joseph A.; Maziarka, Robert J.; and Johnson, Fredrick A., 3,877,533.

Johnson, Gordon W., to Caterpillar Tractor Company. Single pump hydrostatic transmission control and supply system. 3,877,224, Cl. 60-389.000.

Johnson & Johnson: *See—*
Nash, Lawrence M., 3,877,103.

Johnson, Norman Allen. Fluid operated grapple. 3,877,743, Cl. 294-88.000.

Johnson, Timothy E.; and Norton, Thomas K. Inflatable sauna. 3,877,084, Cl. 4-160.000.

Johnson, Walter J.: *See—*
Cox, Arthur; and Johnson, Walter J., 3,877,792.

Johnson, Wayne F.; and Mathis, Richard A., to United States of America, Atomic Energy Commission. Data processor for multistation photometers. 3,878,378, Cl. 235-151.350.

Johnson, Wilfred V. Thermally insulated actuator for fire sprinkler heads. 3,877,527, Cl. 169-90.000.

Johnston, Ervin R., to Sterling-Bruce, Incorporated. Method of molding curved veneer laminated stock. 3,878,015, Cl. 156-222.000.

Johnston, Michael B.: *See—*
Jones, Robert H.; and Johnston, Michael B., 3,877,875.

Jones, David Peter Marshall, to Ilford Limited. Coating roller. 3,877,124, Cl. 29-121.00H.

Jones, Gordon H.: *See—*
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Jones, John Leslie, Sr. Method of making menstrual napkins. 3,878,283, Cl. 264-152.000.

Jones, Robert H.; and Johnston, Michael B., to Beckman Instruments, Inc. Nitrogen constituent analysis. 3,877,875, Cl. 23-230.0PC.

Jordan, Terence D.: *See—*
Willuweit, Werner; and Jordan, Terence D., 3,877,547.

Joschko, Gunter; Schriefl, Karl-Ekkehard; and Winter, Hans-Jurgen, to Ted Bildplatten Aktiengesellschaft; and AEG-Telefunken. Diamond scanning element. 3,877,705, Cl. 274-38.000.

Josef Ess a/k/a Allgaeuer Skibeschlaege Fabrik: *See—*
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Joseph Lucas (Industries) Limited: *See—*
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Jumberca, S. A.: *See—*
Guell, Jose Maria Dalmau, 3,877,257.

Jung, Richard, to L & C Steinmuller GmbH. Device for closing a round hot air or exhaust duct. 3,877,678, Cl. 251-305.000.

Junger, Hans; Weissenfels, Franz; and Pungs, Wolfgang. Method of improving the strength of adhesion of cellulosic coverings to phenolic resin foam materials. 3,877,967, Cl. 428-314.000.

Jureit, John Calvin; and Scipos, Andrew G., to Automated Building Components, Inc. Bed frame construction. 3,877,091, Cl. 5-200.00R.

Jureit, John Calvin; Kushner, Ben; Leutwyler, Roy; and Castillo, Adolfo, to Automated Building Components, Inc. Magazine feed of connector plate stock. 3,877,608, Cl. 221-236.000.

Jury, Rae Goldwin, to Bell, Arthur, a part interest. Dome hubs for geodesic construction. 3,877,824, Cl. 403-174.000.

Kabushiki Kaisha Kawai Gakki Seisakusho: *See—*
Obayashi, Nobuharu; and Sakashita, Tetsuzi, 3,877,337.

Kabushiki Kaisha Suwa Seikosha: *See—*
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Shimodaira, Tadayoshi; and Gomi, Yoshifumi, 3,877,560.

Kabushiki-Kaisha Tokai Rika Denki Seisakusho: *See—*
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Kaiser Aluminum & Chemical Corporation: *See—*
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Kalle Aktiengesellschaft: *See—*
Bock, Hartmut; Melzer, Werner; Schroeder, Helmut; and Schupmehl, Leo, 3,877,820.

Kalmus, Henry P., to United States of America, Army. Field fuze. 3,877,382, Cl. 102-70.20P.

Kalopissis, Gregoire; and Vanlerberghe, Guy. Cosmetic compositions. 3,877,955, Cl. 106-266.000.

Kamada, Masashi: *See—*
Ono, Kaoru; Kamada, Masashi; Ohisuru, Hiroyuki; Wakabayashi, Yoshikazy; Nakamura, Shotaro; and Yamada, Tadashi, 3,877,881.

Kamar Products, Inc.: *See—*
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Kamijo, Hirotaka: *See—*
Kubota, Koji; Onoda, Takiko; Kamijo, Hirotaka; and Okumura, Shinji, 3,878,044.

Kaminow, Ivan Paul, to Bell Telephone Laboratories, Incorporated. Electro-optical thin-film device. 3,877,781, Cl. 350-96.0WG.

Kaminow, Ivan Paul, to Bell Telephone Laboratories, Incorporated. Electro-optical thin film device. 3,877,782, Cl. 350-96.0WG.

Kamlet, Mortimer J.; and Minesinger, Richard R., to United States of America, Navy. Polymerization process for making nitro compounds, useful as explosives. 3,878,004, Cl. 149-88.000.

Kamogawa, Toshiro: *See—*
Okino, Yoshihiro; Kamogawa, Toshiro; and Kato, Makoto, 3,877,776.

Kanani, Diamond Pirbhai; Sherrington, Peter John; and Steer, David Charles, to Imperial Chemical Industries Limited. Separating yeast and/or bacterial cells from a liquid medium. 3,878,093, Cl. 210-51.000.

Kanayama, Hikoyoshi: *See—*
Tatsumi, Tetsujiro; Miyamoto, Reiji; Matsui, Yutaka; Kazama, Seiji; Takemura, Tadao; and Kanayama, Hikoyoshi, 3,877,969.

Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See—*
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Kanemoto, Katsuo: *See—*
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Karl Altenburger: *See—*
Fritz, Helmuth, 3,877,709.

Karr, Fred A., to Shasta Beverages Division of Consolidated Food Corporation. Carbonated beverage system. 3,877,358, Cl. 99-275.000.

Karrer, Henry E.: *See—*
Dias, J. Fleming; and Karrer, Henry E., 3,878,477.

Kasai, Syoji; and Onoda, Yoshimitsu, to Hitachi, Ltd. Traction car. 3,877,387, Cl. 105-49.000.

Kasberg, Alvin H., to Atlantic Richfield Company. Method of making spent nuclear fuel shipping casks. 3,878,275, Cl. 264-.500.

Kasubuchi, Takeshi; Sumitomo, Yuji; and Aiba, Masahiko, to Sharp Kabushiki Kaisha. Ink jet system of charge amplitude controlling type. 3,878,517, Cl. 346-75.000.

Kasugai, Hiroshi: *See—*
Matsui, Kazuo; Kasugai, Hiroshi; Matsuya, Kuni; and Aizawa, Hiroyasu, 3,878,224.

Kato, Makoto: *See—*
Okino, Yoshihiro; Kamogawa, Toshiro; and Kato, Makoto, 3,877,776.

Katz, Helmut, to Siemens Aktiengesellschaft. Vacuum - tight carbon bodies. 3,878,425, Cl. 313-352.000.

Kautex-Werke Reinold Hagen GmbH: *See—*
Kiefer, Erich; Klusener, Peter; and Hagen, Dieter, 3,877,861.

Kawada, Hiroaki: *See—*
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Kawada, Koichi: *See—*
Mochizuki, Tadao; and Kawada, Koichi, 3,878,097.

Kawai, Yoshihisa, to Minolta Camera Kabushiki Kaisha. Paper feed stoppage detection means in an electronic photocopying machine. 3,878,540, Cl. 340-259.000.

Kawai, Yoshio; Araki, Tadashi; Watanabe, Kazuhiro; Takahashi, Ryoichi; Noguchi, Kazuo; Hatazawa, Nobuo; and Hatazawa, Nobuo, to Kureha Kagaku Kogyo Kabushiki Kaisha. Method for producing resinous pitch. 3,878,087, Cl. 208-40.000.

Kawamura, Tamio: *See—*
Murao, Sawao; Satoi, Shuzo; Kuwana, Noriaki; Fukumura, Masayuki; and Kawamura, Tamio, 3,878,185.

Kawato, Masahiko: *See—*
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KcKenney, John D.; and Conway, William H., to McKenney, John D.; and Conway, William H., a part interest to each. Method and apparatus for testing shock absorbers. 3,877,289, Cl. 73-11.000.

Kearney & Trecker Corporation: *See—*
Kirkham, Edward E.; Zankl, Frank; Stobbe, Richard E.; and Schachte, John J., 3,878,445.

Keating, Richard T. Electric deep fat fryer with controlled heat during start-up. 3,877,359, Cl. 99-331.000.

Keegan, James J.; Patel, Girish; and Rubin, Howard, to Warner-Lambert Company. Denture adhesive preparation containing an anionic protein material. 3,878,135, Cl. 260-8.000.

Keegan, James J.; Patel, Girish; and Rubin, Howard, to Warner-Lambert Company. Anhydrous products having improved wettability characteristics. 3,878,138, Cl. 260-17.00R.

Keever, Joseph M.: *See—*
McClelland, Theodore M., III; and Keever, Joseph M., 3,878,391.

Keimpema, Keimpe Klaas, to U.S. Philips Corporation. Hair drying hood. 3,877,153, Cl. 34-99.000.

Keller, Juergen H. H.; and Sprague, Robert H., to Itek Corporation. Polyrhodanine sensitizers for organic photoconductors. 3,877,937, Cl. 96-1.600.

Keller, Rudolf; Klebe, Hans; and Vollbrecht, Heinz-Rudiger, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for the production of metal free chlorosilane by the chlorination or hydrochlorination of ferrosilicon. 3,878,291, Cl. 423-341.000.

Keller, Wolfgang: *See—*
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Kelley Company, Inc.: *See—*
Artzberger, Thomas G., 3,877,102.

Kelley, Joe A.: *See—*
Matta, Michael S.; Kelley, Joe A.; and Rohde, Michael F., 3,878,043.

Kelley, Thomas J. Combination trailer and pontoon boat. 3,877,094, Cl. 9-1.00T.

Kenco Engineering Company: *See—*
Mills, Kenneth N., 3,877,476.

Kennedy, Sterling R. Sewage treatment apparatus. 3,878,101, Cl. 210-202.000.

Kennedy Van Saun Corporation: *See—*
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Kenward, Richard George: *See—*
Moody, Asa Carlyle, Jr.; Kenward, Richard George; and Shiver, James William, 3,878,379.

Keown, Robert William, to du Pont de Nemours, E. I., and Company. Mastics derived from neoprene latex. 3,878,154, Cl. 260-29.70N.

Keppeler, Dieter, to Carl Walther Sportwaffenfabrik. Device for mounting a gun barrel on a firearm. 3,877,167, Cl. 42-75.00B.

Kerfoot, William B.; and Vaccaro, Ralph F. Analytic device and method for monitoring heavy metals in natural waters. 3,877,878, Cl. 23-253.0TP.

Ketterer, Stanley J., to Singer Company, The. Presser devices for sewing buttonholes. 3,877,403, Cl. 112-77.000.

Kholodnitskaya, Galina Vasilievna: *See—*
Kormer, Vitaly Abramovich; Jufa, Tatyana Lvovna; Babitsky, Boris Davidovich; Markova, Viktoriya Vladimirovna; Lobach, Mark Iosifovich; Kovalev, Nikolai Fedorovich; Poletaeva, Irina Alexandrovna; Simanova, Nadezhda Pavlovna; Lapuk, Irina Moiseevna; and Kholodnitskaya, Galina Vasilievna, 3,878,182.

Kiefer, Erich; Klusener, Peter; and Hagen, Dieter, to Kautex-Werke Reinold Hagen GmbH. Blow moulding machine with cam controlled reciprocating carriage. 3,877,861, Cl. 425-387.00B.

Kiessling, Hans-Joachim: *See—*
Hofel, Heinz-Bernhard; Kiessling, Hans-Joachim; and Lampert, Fred, 3,878,136.

Kikuchi, Yoshiyasu; Kawada, Hiroaki; Yamaguchi, Takanori; Ito, Tadashi; and Tsuiki, Hideo, to Nippon Electric Company, Limited. Character recognition system. 3,878,509, Cl. 340-146.30H.

Killick, Herbert Percy, to Dental Manufacturing Engineering Limited. High speed turbines. 3,877,574, Cl. 206-368.000.

Kimura, Ichiro: *See—*
Amano, Matsuo; Kimura, Ichiro; Ito, Tosikatsu; and Kanemoto, Katsuo, 3,877,638.

Kimura, Takeshi: *See—*
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Kinemetrics, Inc.: *See—*
Rihn, William Joseph, 3,877,296.

Kingston, Arthur William. Accessory for flash photography. 3,878,385, Cl. 240-1.300.

Kino, Gordon S.: *See—*
Coldren, Larry A.; and Kino, Gordon S., 3,877,982.

Kinsolving, Richard: *See—*
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Kirkham, Edward E.; Zankl, Frank; Stobbe, Richard E.; and Schachte, John J., to Kearney & Trecker Corporation. A. C. motor control apparatus and method. 3,878,445, Cl. 318-308.000.

Kishi, Emitsu; Shinohara, Osamu; and Ishikawa, Haruhisa, to Shinhama Pump Mfg. Co., Ltd. Toilet paper roll. 3,877,576, Cl. 206-412.000.

Kishida, Masahiko: *See—*
Nishikubo, Tadatomi; Kishida, Masahiko; and Imaura, Masakazu, 3,878,076.

Kishimoto, Hidetaka: *See—*
Tanaka, Kazuaki; Ishida, Yasuto; Sato, Mamoru; Kishimoto, Hidetaka; and Yanagi, Kimiyoshi, 3,878,058.

Kitayama, Minoru: *See—*
Watanabe, Shozo; Kitayama, Minoru; Yamadera, Shigenori; Taniguchi, Yasuyuki; and Yamaguchi, Susumu, 3,877,977.

Kitzing, Rainer, to Ciba-Geigy AG. Process for crosslinking hydrophilic colloids using unsaturated aldehydes containing N-heterocyclic rings. 3,878,171, Cl. 260-73.00R.

Klauke, Erich: *See—*
Hempel, Jan; and Klauke, Erich, 3,878,242.

Klaus, Franz; and Fichtner, Hans E. Pump. 3,877,844, Cl. 417-420.000.

Klebe, Hans: *See—*
Keller, Rudolf; Klebe, Hans; and Vollbrecht, Heinz-Rudiger, 3,878,291.

Klein, Walter A. Water saving device for water closet. 3,877,081, Cl. 4-1.000.

Kleiner, Norbert; and Montague, Hill, to Scope Incorporated. High speed analog to digital converter recirculating analog input for high speed output. 3,878,533, Cl. 340-347.0AD.

Klement, Gunter: *See—*
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Klesper, Hugo: *See—*
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Kluge, Reinhard: *See—*
Kluge, Willi; and Kluge, Reinhard, 3,877,692.

Kluge, Willi; and Kluge, Reinhard. Device for inserting printed products, for example newspaper inserts, into other printed products, for example newspapers. 3,877,692, Cl. 270-55.000.

Klusener, Peter: *See—*
Kiefer, Erich; Klusener, Peter; and Hagen, Dieter, 3,877,861.

Knepper, Wilhelm: *See—*
Hockele, Gunter; and Knepper, Wilhelm, 3,878,259.

Kniel, Ludwig; and Fussman, Frederick, to Lummus Company, The. Process and apparatus for the storage and transportation of liquefied gases. 3,877,240, Cl. 62-50.000.

Knight, Bruce L.; Rhudy, John S.; and Gogarty, William B., to ICI United States Inc. Use of radiation-induced polymers in cement slurries. 3,877,522, Cl. 166-295.000.

Knohl, Friedrich Karl, to Illinois Tool Works Inc. Concrete penetrating pin. 3,877,340, Cl. 85-28.000.

Knorr-Bremse GmbH: *See—*
Gebhardt, Hans; Prahl, Franz; and Popescu, Corneliu, 3,877,551.

Knoss, Walter, to Ballotini Europe Deutschland GmbH. Method of metal coating particles. 3,877,960, Cl. 264-15.000.

Knox, William M.: *See—*
Tramuta, Salvatore S.; Miller, James G.; and Knox, William M., 3,877,519.

Kobashi, Kiyoshi: *See—*
Nohira, Hidetaka; and Kobashi, Kiyoshi, 3,877,452.

Kobayashi, Saburo. Centrifugal torque converter. 3,877,252, Cl. 64-25.000.

Kobayashi, Shinzo; and Oota, Takahisa, to Mitsubishi Denki Kabushiki Kaisha. Data transmitting system. 3,878,512, Cl. 340-168.00R.

Kobayashi, Tsutomu: *See—*
Fujisawa, Seiji; Irie, Hiroyuki; Kobayashi, Tsutomu; and Uchida, Kosaku, 3,878,558.

Kobayashi, Yoshinori: *See—*
Murato, Kenichi; Sema, Katsutoshi; Wakao, Mitsuru; Kobayashi, Yoshinori; and Hara, Koichi, 3,877,385.

Kobayashi, Yuichi: *See—*
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Kobe Steel, Ltd.: *See—*
Shimizu, Kiyoshi; Minami, Toshihiro; and Niina, Eiji, 3,877,281.

Koch, Christian: *See—*
Michel, Alfred; and Koch, Christian, 3,878,130.

Koch, Keith E.: *See—*
Grawey, Charles E.; Untz, Robert W.; Koch, Keith E.; and Gebhardt, Charles F., 3,877,504.

Kock, Gerhard; Wallrafen, Gunter; Hoffmann, Erhard; and Buschfeld, Hubert, to Maschinen- und Bohrgerate-Fabrik Alfred Wirth & Co., K.G. Tensioning apparatus. 3,877,326, Cl. 81-57.380.

Koehler, Horst, to Josef Ess a/k/a Allgaeuer Skibeschlaege Fabrik. Jaws for a safety ski binding. 3,877,711, Cl. 280-11.35T.

Koernig, Wolfgang: *See—*
Fischer, Roman; Teege, Gernot; Fliege, Werner; and Koernig, Wolfgang, 3,878,149.

Koga, Michio; Fujii, Masaki; and Yui, Hiroshi, to Mitsubishi Petrochemical Company Limited. Fibrous polyolefin particles and production thereof. 3,878,183, Cl. 260-94.90R.

Kohler, Alfred: *See—*
Bauer, Kurt; Dorr, Wilhelm; Kohler, Alfred; Weber, Martin; and Schmid, Eckhardt, 3,877,106.

Komiya, Sanpei; and Saito, Takeo. Rotary compressor with integrally connected, diametrically aligned vanes. 3,877,851, Cl. 418-76.000.

Konan Electric Co., Ltd.: *See—*
Nakajima, Hiroyuki, 3,877,483.

Kondo, Toshiyuki: *See—*
Inada, Masami; and Kondo, Toshiyuki, 3,877,756.

Konig, Horst: *See—*
Wenzel, Werner; Franke, Friedrich H.; Konig, Horst; and Meraikib, Mohammed, 3,877,868.

Konishi, Hideo: *See—*
Masuda, Naosuke; Shimoura, Yoshiyuki; and Konishi, Hideo, 3,877,540.

Konishi, Masami; and Hikita, Kenji, to Nippondenso Co., Ltd.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Air cleaner. 3,877,910, Cl. 55-502.000.

Kononenko, Vadim Grigorievich: *See—*
Saveliev, Anatoly Semenovich; Kononenko, Vadim Grigorievich; Raizman, David Alexandrovich; Boguslavsky, Vitaly Alexandrovich; Yatsenko, Sergei Vasilievich; and Strizhenko, Vitaly Evgenievich, 3,877,331.

Kononov, Valentin Alexeevich: *See—*
Leonidov, Nikolai Konstaninovich; Levin, Lev Yakovlevich; Ipatov, Petr Platonovich; Krasavtsev, Nikolai Ivanovich; Shtepa, Evgeny Dmitrievich; Gerasimenko, Jury Markovich; Degtyarev, Valery Stepanovich; Rybtsov, Alexandr Fedorovich; Tankin, Anatoly Dmitrievich; Sukhorukov, Alexandr Efimovich; Kovylin, Mikhail Mikhailovich; Markovsky, Jury Lvovich; Ryazanov, Evgeny Makarovich; Altukhov, Vyacheslav Alexeevich; Kononov, Valentin Alexeevich; and Yasakov, Evgeny Ivanovich, 3,877,686.

Konstantinov, Veniamin Viktorovich: *See—*
Gorobets, Vladimir Ivanovich; Gorobets, Larisa Zhanovna; Ivanov, Anatoly Alexandrovich; Tropin, Georgy Petrovich; Chirkov, Veniamin Ivanovich; Konstantinov, Veniamin Viktorovich; and Belyaev, Viktor Deomidovich, 3,877,647.

Koo, Ronald C.; and Shurgan, Joel, to Duro-Test Corporation. Method of manufacturing improved filaments for fluorescent lamps. 3,877,495, Cl. 140-71.500.

Koopmann, Hans-Jurgen; and Schmidt, Eike, to Vereinigte Flugtechnische Werke-Fokker GmbH. Electro-hydraulic actuation system with redundancy operation, supervision and emergency operation. 3,877,346, Cl. 91-411.00R.

Koppers Company, Inc.: *See—*
Buzbee, Lloyd R.; and Hite, John D., 3,877,787.
Hyde, Jack, 3,878,053.

Kormer, Vitaly Abramovich; Jufa, Tatyana Lvovna; Babitsky, Boris Davidovich; Markova, Viktoriya Vladimirovna; Lobach, Mark Iosifovich; Kovalev, Nikolai Fedorovich; Poletaeva, Irina Alexandrovna; Simanova, Nadezhda Pavlovna; Lapuk, Irina Moiseevna; and Kholodnitskaya, Galina Vasilievna. Method for preparing carbon-chain linear polymers. 3,878,182, Cl. 260-93.100.

Kotthaus, Erich, to Werkzeugmaschinenfabrik Oerlikan-Buhrle AG. Apparatus for grinding bevel- or hyperboloid-shaped gears. 3,877,176, Cl. 51-90.000.

Koula, Zdenek: *See—*
Brandl, Willi; Koula, Zdenek; and Nirk, Peter, 3,877,511.

Kovacic, Zarko, to U.S. Bike-Lite, Inc. Bicycle signal system. 3,878,387, Cl. 240-7.550.

Kovalev, Nikolai Fedorovich: *See—*
Kormer, Vitaly Abramovich; Jufa, Tatyana Lvovna; Babitsky, Boris Davidovich; Markova, Viktoriya Vladimirovna; Lobach, Mark Iosifovich; Kovalev, Nikolai Fedorovich; Poletaeva, Irina Alexandrovna; Simanova, Nadezhda Pavlovna; Lapuk, Irina Moiseevna; and Kholodnitskaya, Galina Vasilievna, 3,878,182.

Kovylin, Mikhail Mikhailovich: *See—*
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Koyano, Hitoshi: *See—*
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Koyo Seiko Company, Limited: *See—*
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Kraft, Hans-Guenther: *See—*
Irmscher, Klaus; Von Werder, Fritz; Bork, Karl-Heinz; and Kraft, Hans-Guenther, 3,878,228.

Kramer, Daniel E. Refrigeration systems including evaporator with 2 speed fan motor. 3,877,243, Cl. 62-180.000.

Kramer, Norman: *See—*
Licitis, Gunars; and Kramer, Norman, 3,878,521.

Krasavtsev, Nikolai Ivanovich: *See—*
Leonidov, Nikolai Konstaninovich; Levin, Lev Yakovlevich; Ipatov, Petr Platonovich; Krasavtsev, Nikolai Ivanovich; Shtepa, Evgeny Dmitrievich; Gerasimenko, Jury Markovich; Degtyarev, Valery Stepanovich; Rybtsov, Alexandr Fedorovich; Tankin, Anatoly Dmitrievich; Sukhorukov, Alexandr Efimovich; Kovylin, Mikhail Mikhailovich; Markovsky, Jury Lvovich; Ryazanov, Evgeny Makarovich; Altukhov, Vyacheslav Alexeevich; Kononov, Valentin Alexeevich; and Yasakov, Evgeny Ivanovich, 3,877,686.

Kraus, Edmund J.: *See—*
Kraus, Robert A.; and Kraus, Edmund J., 3,877,731.

Kraus, Robert A.; and Kraus, Edmund J. Coupling. 3,877,731, Cl. 285-82.000.

Krause, Thomas J., to Outboard Marine Corporation. Snowmobile track suspension system. 3,877,534, Cl. 180-5.00R.

Kremen, Seymour S.; Foreman, Gerald E.; and Chirrick, John M., to United States of America, Interior. Semipermeable membranes. 3,877,978, Cl. 210-23.000.

Krenke, Norman O.; Baker, John R.; Sims, DeWitt; and Skarin, Carl R., to Baker Perkins Inc. Bakery product depanning apparatus. 3,877,592, Cl. 214-309.000.

Kresta, Erich, to Semperit Aktiengesellschaft. Vehicle tire with tire bead ply means and method for the manufacture thereof. 3,878,013, Cl. 156-132.000.

Kriisa, Agu: *See—*
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Krishnan, Ramamurthy Gopal: *See—*
Descary, John Gilbert; and Krishnan, Ramamurthy Gopal, 3,878,039.

Kroebel, Reinhard, to Bayer Aktiengesellschaft. Process for the electrolytic reduction of fissionable elements. 3,878,060, Cl. 204-1.500.

Kroenke, William J., to B. F. Goodrich Company, The. Flame and smoke retardant vinyl chloride and vinylidene chloride polymer compositions. 3,878,167, Cl. 260-45.90R.

Krogseng, Helge. Water skis. 3,877,409, Cl. 115-25.000.

Kross, Robert D., to Hydro Optics, Inc. Ostomy gasket. 3,877,431, Cl. 128-283.000.

Kruppert, Frederick William: *See—*
Franceschina, Louis E.; Haromy, Fred; and Kruppert, Frederick William, 3,877,685.

Kubota, Koji; Onoda, Takiko; Kamijo, Hirotaka; and Okumura, Shinji, to Ajinomoto Co., Inc. Method of producing L-arginine by fermentation. 3,878,044, Cl. 195-29.000.

Kubotera, Haruo: *See—*
Kurihara, Takao; Tanaka, Nobuo; Yamagishi, Toru; Nakaoka, Kazuhide; Araki, Kenzi; Iwase, Kozi; and Kubotera, Haruo, 3,877,684.

Kuenzy, Fred, to Renfag S.A. Preparation of 2 alkoxy-5-alkylsulphonyl-benzoic acids. 3,878,240, Cl. 260-521.00S.

Kuhlmann-Schafer, Wilhelm. Crystal melting apparatus fashioned to eliminate bubbles entrapped in the melt. 3,877,880, Cl. 23-273.0SP.

Kulle, Elfriede; and Meyer, Rolf, to ISCO Optische Werke GmbH Gottingen. Plastic lens mounting for varifocal objective. 3,877,794, Cl. 350-187.000.

Kullman, Russell M. H.: *See—*
Reinhardt, Robert M.; Kullman, Russell M. H.; Cashen, Norton A.; and Reid, John D., 3,878,123.

Kunschner, Alois: *See—*
Dahmen, Kurt; and Kunschner, Alois, 3,877,952.

Kunugi, Taiseki; Fujimoto, Kaoru; and Takashima, Hiroaki, to Taiseki Kunugi. Process for producing conjugated diolefins. 3,878,260, Cl. 260-680.00E.

Kupelian, Vahey S., to United States of America, Navy. Directed warhead. 3,877,376, Cl. 102-67.000.

Kurczek, Wolfgang: *See—*
Deutschmann, Herbert; Kurczek, Wolfgang; and De Lazzer, Karl-Heinz, 3,877,126.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Kawai, Yoshio; Araki, Tadashi; Watanabe, Kazuhiro; Takahashi, Ryoichi; Noguchi, Kazuo; Hatazawa, Nobuo; and Hatazawa, Nobuo, 3,878,087.
Murayama, Naohiro; and Oikawa, Takao, 3,878,274.

Kurihara, Takao; Tanaka, Nobuo; Yamagishi, Toru; Nakaoka, Kazuhide; Araki, Kenzi; Iwase, Kozi; and Kubotera, Haruo, to Nippon Kokan Kabushiki Kaisha. Continuous annealing furnace. 3,877,684, Cl. 266-3.00R.

Kurita, Takaji, to Minolta Camera Kabushiki Kaisha. Image scanning device in a photocopying apparatus. 3,877,807, Cl. 355-66.000.

Kurosaki, Shiro: *See*—
Shiraishi, Satoshi; Fujiwara, Kunio; and Kurosaki, Shiro, 3,877,912.

Kurpanek, Waldemar Helmut. Magneto-motive reciprocating device. 3,878,412, Cl. 310-24.000.

Kurzon, Sarah A.: *See*—
Heinmets, Ferdinand, 3,877,306.

Kushner, Ben: *See*—
Jureit, John Calvin; Kushner, Ben; Leutwyler, Roy; and Castillo, Adolfo, 3,877,608.

Kuwana, Kazutaka, to Aisin Seiki Kabushiki Kaisha. Process for the control of an antiskid braking system and apparatus adapted for performing the same. 3,877,758, Cl. 303-21.00F.

Kuwana, Noriaki: *See*—
Murao, Sawao; Satoi, Shuzo; Kuwana, Noriaki; Fukumura, Masayuki; and Kawamura, Tamio, 3,878,185.

Kuzminski, Henry William; and Sohn, Frank Myung-Hi, to RCA Corporation. Cathode ray tube having shadow mask and screen with tailored heat transfer properties. 3,878,428, Cl. 313-408.000.

Kyowa Hakko Kogyo Kabushiki Kaisha: *See*—
Fukumoto, Juichiro; and Okada, Shigetaka, 3,878,191.

Kyowa Yuka Kabushiki Kaisha: *See*—
Tanaka, Kazuaki; Ishida, Yasuto; Sato, Mamoru; Kishimoto, Hidetaka; and Yanagi, Kimiyoshi, 3,878,058.

L & C Steinmuller GmbH: *See*—
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Labofina S.A.: *See*—
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Lachowicz, Donald R.: *See*—
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LaCombe, Rene: *See*—
Druge, Gerard; and LaCombe, Rene, 3,877,456.

Lader, Leon J.: *See*—
Hulderman, Garry N.; Lader, Leon J.; and Winderman, Jay B., 3,878,480.

Laethem, Alfred F.; and Carr, Peter, to Occidental Energy Development Company. Method of slowing escape of chlorine from metal-chlorine battery. 3,877,990, Cl. 136-86.00A.

Lafiandra, Carlo F. Precision base mercury vapor lamp. 3,878,419, Cl. 313-51.000.

Lai, Tsu-Yu; and Chien, Kuo-Neng. Paper container. 3,877,631, Cl. 229-41.00C.

Laing, Nikolaus. Temperature-control system with rotary heat exchangers. 3,877,515, Cl. 165-86.000.

Laker, Patrick Allen, to Rudgwick Brickworks Company Limited. Method and apparatus for the manufacture of bricks. 3,877,866, Cl. 432-6.000.

Lally, Joseph Edward: *See*—
Foster, Colin Edwin; and Lally, Joseph Edward, 3,877,701.

Lambert, Albert D.: *See*—
Owens, Andrew C., 3,877,690.

Lambert Brake Corporation: *See*—
Hahn, Emil H., 3,877,550.

Lampert, Fred: *See*—
Hofel, Heinz-Bernhard; Kiessling, Hans-Joachim; and Lampert, Fred, 3,878,136.

LaMura, Joseph L., to Joanell Laboratories, Inc. Fountain brush. 3,877,822, Cl. 401-101.000.

Lancellin, Jacques, to Volucompteurs Aster-Boutillon. Nozzles of fluid dispensing valves of the automatic shutoff type. 3,877,498, Cl. 141-198.000.

Lancor, Ellen B., administratrix: *See*—
Lancor, Joseph H., Jr., deceased; and Rak, Arthur, 3,878,114.

Lancor, Joseph H., Jr., deceased (by Lancor, Ellen B., administratrix); and Rak, Arthur, to Bell & Howell Company. Information carrier. 3,878,114, Cl. 352-29.000.

Lane, Wyman C.: *See*—
Yew, Nelson C.; and Lane, Wyman C., 3,878,392.

Lange, Hellmuth, to Jagenberg-Werke AG. Circular blade apparatus for slitting webs of material. 3,877,335, Cl. 83-501.000.

Langland, Herbert Z., to Allis-Chalmers Corporation. Cushioned hydraulic actuator. 3,877,344, Cl. 91-406.000.

Lanigan, Frederick Harold, to Bell Telephone Laboratories, Incorporated. Automatic channel switching system. 3,878,463, Cl. 325-2.000.

Lapuk, Irina Moiseevna: *See*—
Kormer, Vitaly Abramovich; Jufa, Tatyana Lvovna; Babitsky, Boris Davidovich; Markova, Viktoriya Vladimirovna; Lobach, Mark Iosifovich; Kovalev, Nikolai Fedorovich; Poletaeva, Irina Alexandrovna; Simanova, Nadezhda Pavlovna; Lapuk, Irina Moiseevna; and Kholodnitskaya, Galina Vasilievna, 3,878,182.

Laramee, Richard C.: *See*—
McCullough, Edward E.; Bambrick, Robert W.; and Laramee, Richard C., 3,877,646.

Larsson, Lars-Inge Bertil. Sound-reducing, composite converting panel. 3,878,032, Cl. 428-101.000.

Lauressergues, Henri Pierre: *See*—
Vilain, Pol Ghislain; Beziat, Daniel Bernard; Hatinguais, Philippe Maurice; and Lauressergues, Henri Pierre, 3,878,299.

Law, Harold Bell: *See*—
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Lawrence, James E.: *See*—
Hughes, James L.; and Lawrence, James E., 3,877,480.

Lawrence Peska Associates, Inc.: *See*—
Harvey, Earl William, 3,877,100.

Layton, John M., to General Motors Corporation. Pressurized hot air choke. 3,877,223, Cl. 60-307.000.

LeBlanc, Michael P. Fishing accessory. 3,877,144, Cl. 30-124.000.

Leckband, Uwe: *See*—
Wochnowski, Waldemar; Leckband, Uwe; Barth, Hans-Heinrich; and Hohm, Reinhard, 3,877,469.

Le Couturier, George Henry, to Soges (Societe Generale d'Economie et de Service). Air-conditioning appliance setting up a double air circulation. 3,877,247, Cl. 62-428.000.

Lederer, Seymour J.: *See*—
Grier, Nathaniel; and Lederer, Seymour J., 3,877,922.

Lee, Charles A.: *See*—
Sorrells, Frank D.; and Lee, Charles A., 3,878,279.

Lee, Cheuk Man, to Abbott Laboratories. 5H-[1]benzopyrano[3,4-d]pyridines. 3,878,219, Cl. 260-295.00T.

Lee, Samuel: *See*—
Dellian, Kurt A.; Weiskopf, Marvin; and Lee, Samuel, 3,877,870.

Lee, Sun Yong, to Adolph Coors Company. Multi-differential agar culture medium. 3,878,050, Cl. 195-100.000.

Leeds, Kenneth W. Treatment of a printing plate with a dampening liquid. 3,877,372, Cl. 101-465.000.

Leeds & Northrup Company: *See*—
Voorhoeve, Ernst W., 3,878,434.

Lefebvre, Arthur H.; Stocker, Harold L.; Reider, Samuel B.; and Tomlinson, Jerry G., to General Motors Corporation. Combustion apparatus air supply. 3,877,221, Cl. 60-39.650.

Legros, Andre: *See*—
Legros, Raymond; and Legros, Andre, 3,877,117.

Legros, Raymond; and Legros, Andre. Fastener for bracelet. 3,877,117, Cl. 24-241.0SL.

Le Guennec, Raymond: *See*—
Mesnet, Gerard; Dadon, Georges; Le Guennec, Raymond; Remon-Beauvais, Philippe; Pivet, Yann; and Le Luherne, Armand, 3,877,664.

Lehmann, Matt: *See*—
Wright, Maynard L.; Lehmann, Matt; and Cumming, Raymond C., 3,878,520.

Leitnaker, James M.; and Lindemer, Terrence B., to United States of America, Energy Research and Development Administration. Oxynitride fuel kernel for gas-cooled reactor fuel particles. 3,878,041, Cl. 176-67.000.

LEK tovarna farmacevtskih in kemicnih izdelkov: *See*—
Zupancic, Boris, 3,878,243.

Leland, Ragnvald G. Interchangeable cartridge for fountain paint rollers. 3,877,823, Cl. 401-197.000.

Le Luherne, Armand: *See*—
Mesnet, Gerard; Dadon, Georges; Le Guennec, Raymond; Remon-Beauvais, Philippe; Pivet, Yann; and Le Luherne, Armand, 3,877,664.

Lemelson, Jerome H. Appliance. 3,877,207, Cl. 56-13.200.

Lemery, Jean Paul, to Etablissements Carpano & Pons S.A. Fishing reel. 3,877,658, Cl. 242-84.20A.

Lennox Industries, Inc.: *See*—
Parker, Sidney A.; and Cawley, Richard E., 3,877,837.

Leo, Bruno S., to Hughes Aircraft Company. Free piston cryogenic refrigerator with phase angle control. 3,877,239, Cl. 62-6.000.

Leonidov, Nikolai Konstaninovich; Levin, Lev Yakovlevich; Ipatov, Petr Platonovich; Krasavtsev, Nikolai Ivanovich; Shtepa, Evgeny Dmitrievich; Gerasimenko, Jury Markovich; Degtyarev, Valery Stepanovich; Rybtsov, Alexandr Fedorovich; Tankin, Anatoly Dmitrievich; Sukhorukov, Alexandr Efimovich; Kovylin, Mikhail Mikhailovich; Markovsky, Jury Lvovich; Ryazanov, Evgeny Makarovich; Altukhov, Vyacheslav Alexeevich; Kononov, Valentin Alexeevich; and Yasakov, Evgeny Ivanovich. Blast furnace charger. 3,877,686, Cl. 266-27.000.

LePape, Auguste Raymond: *See*—
Marie, Gerard J. M.; Donjon, Jacques; LePape, Auguste Raymond; and Monod, Bernard, 3,878,328.

L'Eplattenier, Francois; and Pugin, Andre, to Ciba-Geigy Corporation. Process for the manufacture of coloured polycyclic metal complexes. 3,878,188, Cl. 260-146.00R.

Lerman, Theodore B.; and McFarland, Charles M., to General Electric Company. Hydration-disintegration of cobalt-rare earth alloy containing material. 3,877,999, Cl. 148-105.000.

Lerman, Theodore B.: *See*—
McFarland, Charles M.; Lerman, Theodore B.; and Rockwood, Alan C., 3,878,000.

Lerner, Theodore: *See*—
United States of America, National Aeronautics and Space Administration; McChesney, James R.; Lerner, Theodore; and Fitch, Ernest J., 3,878,464.

Lersch, Alfred E., to A. Evans Lersch Corporation. Self-uprighting baseball batting practice tee. 3,877,697, Cl. 273-26.00R.

Lette, Lee; and Andre, Paul, to Talley Industries, Inc. Gas generating device. 3,877,882, Cl. 23-281.000.

Leutwyler, Roy: *See—*
Jureit, John Calvin; Kushner, Ben; Leutwyler, Roy; and Castillo, Adolfo, 3,877,608.

Lever Brothers Company: *See—*
Coleman, Michael Herder; Hannan, Roland Sydney; and Osborne, David Richard Duke, 3,878,307.

Levin, Berton P.; and Stoddard, Darrell D., to Sierracin Corporation, The. Body covering and warming apparatus. 3,878,361, Cl. 219-522.000.

Levin, Lev Yakovlevich: *See—*
Leonidov, Nikolai Konstaninovich; Levin, Lev Yakovlevich; Ipatov, Petr Platonovich; Krasavtsev, Nikolai Ivanovich; Shtepa, Evgeny Dmitrievich; Gerasimenko, Jury Markovich; Degtyarev, Valery Stepanovich; Rybtsov, Alexandr Fedorovich; Tankin, Anatoly Dmitrievich; Sukhorukov, Alexandr Efimovich; Kovylin, Mikhail Mikhailovich; Markovsky, Jury Lvovich; Ryazanov, Evgeny Makarovich; Altukhov, Vyacheslav Alexeevich; Kononov, Valentin Alexeevich; and Yasakov, Evgeny Ivanovich, 3,877,686.

Levine, Charles A.; and Tsang, Floris Y., to Dow Chemical Company, The. Potassium borate glass compositions. 3,877,995, Cl. 136-146.000.

Lewis, A. Beverley, to Bonan Footwear Company, Inc. Thermoplastic rubber footwear. 3,877,101, Cl. 12-142.0RS.

Lewis, Donald J.; and Lucore, Richard W., to Allied Chemical Corporation. Inflator-connector for inflatable vehicle safety belts. 3,877,719, Cl. 280-150.0AB.

Librach, Samuel, to Raymond Lee Organization, Inc., The, a part interest. Uterine elevator and manipulator. 3,877,433, Cl. 128-303.00R.

Licentia Patent-Verwaltungs-G.m.b.H.: *See—*
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Lichtneckert, Stefan; Lundgren, Claes; and Ferno, Ove, to Aktiebolaget Leo. Chewable tobacco substitute composition. 3,877,468, Cl. 131-2.000.

Licitis, Gunars; and Kramer, Norman, to Marvin Glass & Associates. Remotely controlled toy having a non-frequency discriminating receiver. 3,878,521, Cl. 343-225.000.

Liddell, William S. Image transmitting apparatus. 3,877,800, Cl. 353-30.000.

Lieske, Edgar: *See—*
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Limburg, William W.; and Seanor, Donald A., to Xerox Corporation. Photoconductive copolymer of N-vinylcarbazole and N-vinylphthalimide. 3,877,936, Cl. 96-1.500.

Lin, Burn Jeng, to International Business Machines Corporation. Beam address optical storage head. 3,877,784, Cl. 350-96.0WG.

Lincoln Brass Works, Inc.: *See—*
Duperow, Donald E., 3,877,865.

Lindemer, Terrence B.: *See—*
Leitnaker, James M.; and Lindemer, Terrence B., 3,878,041.

Link, Edwin A., to RTE Corporation. Protective apparatus for underground high voltage electrical devices. 3,878,314, Cl. 174-37.000.

Lipes, Arnold. Frankfurter packaging machine. 3,877,199, Cl. 53-59.00R.

Lippert, Axel: *See—*
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Lipscomb, Virgil J. PCV valve filter. 3,877,451, Cl. 123-119.00B.

Litchfield, Mason Rawleigh, to Smith International, Inc. Method of assembling drill string using fluid saver valve. 3,877,529, Cl. 175-65.000.

Litton Industries, Inc.: *See—*
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Livingston, Johnston R., to Marcor Housing Systems, Incorporated. Dwelling construction system. 3,877,187, Cl. 52-143.000.

Livshits, Rem Markovich: *See—*
Samoilov, Vladimir Ivanovich; Livshits, Rem Markovich; Morin, Boris Pavlovich; and Rogovin, Zakhar Alexandrovich, 3,878,144.

Lobach, Mark Iosifovich: *See—*
Kormer, Vitaly Abramovich; Jufa, Tatyana Lvovna; Babitsky, Boris Davidovich; Markova, Viktoriya Vladimirovna; Lobach, Mark Iosifovich; Kovalev, Nikolai Fedorovich; Poletaeva, Irina Alexandrovna; Simanova, Nadezhda Pavlovna; Lapuk, Irina Moiseevna; and Kholodnitskaya, Galina Vasilievna, 3,878,182.

Locascio, Jack J., to Rapid-American Corporation. Foundation garment. 3,877,439, Cl. 128-547.000.

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Lockard, Joseph Larue, to AMP Incorporated. Cam operated switch assembly having split housing, double action wiping resilient contacts and detent structure. 3,878,344, Cl. 200-6.00B.

Loeffel, Hansrolf: *See—*
Frohlich, Alfred; and Loeffel, Hansrolf, 3,877,949.

Logan, James H., to General Electric Company. Direct-wound, precision deflection yoke with adhesive coated core. 3,878,490, Cl. 335-210.000.

Loge, Olaf: *See—*
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Lohmann, Joachim Werner, to Agfa-Gevaert. Nitro-substituted aryl amide amine progenitor and the use thereof in photographic processes. 3,877,941, Cl. 96-48.00R.

Lohr, Delmar F., Jr.; and Kay, Edward Leo, to Firestone Tire & Rubber Company, The. Stabilized polybutadiene resins. 3,878,150, Cl. 260-23.70R.

Long, James, to Sentinel Star Company. Electronic copy sender. 3,877,607, Cl. 221-12.000.

Long, Raymond H.; and Sze, Morgan C. Desulfurizing coke with phosgene or a mixture of carbon monoxide and chlorine. 3,878,051, Cl. 201-17.000.

Longworth, Alfred, to Radiation Limited. Fluid flow control valves. 3,877,478, Cl. 137-94.000.

Loomis, Russell M.; Bertram, Leroy W.; McLaughlin, Gerald R.; and Gaikowski, Michael D., to Unarco Industries, Inc. Pneumatic lading divider. 3,877,393, Cl. 105-492.000.

Lo Presti, Arthur; and Baumann, Robert P., to United States of America, Army. Composite double base propellant with HMX oxidizer. 3,878,003, Cl. 149-19.800.

Lorenz, Walter; and Hammann, Ingeborg, to Bayer Aktiengesellschaft. Pyridazinothionophosphoric (-phosphonic) acid esters. 3,878,210, Cl. 260-250.0AP.

Losert, Wolfgang Felix: *See—*
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Lott, Alfred Robert, to Imperial Chemical Industries Limited. Tetrafluoroethylene polymer compositions. 3,878,164, Cl. 260-42.270.

Lotz, Larry C.; and Ford, Thomas D., to Whirlpool Corporation. Oven door. 3,877,460, Cl. 126-200.000.

Louie, Albert; Childs, Willard D.; and Duncan, A. Bruce, to Rucker Company, The. Speed limiting valve. 3,877,489, Cl. 138-46.000.

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Louzecky, Paul J., to General Motors Corporation. Rotary engine drain pump arrangement. 3,877,852, Cl. 418-88.000.

Lovell, Gary Eugene: *See—*
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Lowe, Greg E., to Lowe Alpine Systems, Inc. Anchor device for mountain climbers. 3,877,679, Cl. 254-135.000.

Lowrie, Neely E., to Combustion Engineering, Inc. Gas-liquid separator. 3,877,904, Cl. 55-392.000.

Lubrizol Corporation, The: *See—*
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Lucas Electrical Company Limited, The: *See—*
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Luck, James R., to Honeywell Inc. Carbon monoxide sensor. 3,878,080, Cl. 204-195.00P.

Luck, Russell M.; and Gainer, Gordon C., to Westinghouse Electric Corporation. Lubricant-refrigerant system for centrifugal refrigeration compressors. 3,878,112, Cl. 252-10.000.

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Lumbard, Edward B., to Poster Products, Inc. Frame assembly. 3,877,165, Cl. 40-152.000.

Lummus Company, The: *See—*
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Lyons, Robert J. Emergency latch for a hatch structure. 3,877,173, Cl. 49-7.000.

Mabie, Norman H.; and Putnam, John P. Keel for snowmobile front skis. 3,877,713, Cl. 280-28.000.

MacDonald, John A., to Railtech Ltd. Temperature indicator bolts. 3,877,411, Cl. 116-114.500.

MacDonald, Norman L., to General Motors Corporation. Dynamic brake limiting system. 3,878,447, Cl. 318-375.000.

MacFarlane, Iain Mackay, to Fiber Industries, Inc. Draw textured yarn and process. 3,877,213, Cl. 57-140.00R.

MacGovern, Alan J., to Itek Corporation. Image translation apparatus. 3,877,801, Cl. 353-38.000.

Mach, Jan; Rybar, Vaclav; and Drapal, Radovan, to Stav Praha, vyrobni stavebni druzstno stredisko Monta. Apparatus for heating fluids. 3,877,441, Cl. 122-250.00R.

Mack, Robert P.: *See—*
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Mack, Ronald H.; and Bumgardner, Donald L., to Burroughs Corporation. Media tray for use in a credit authorization terminal of a data processing system. 3,878,364, Cl. 235-61.70B.

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Orth, Edward D.; Van Bennekom, Carl F.; and MacPherson, Ronald H., 3,878,462.

Maddock, Edwin A. Lubricant dispensing means and system. 3,877,271, Cl. 72-23.000.

Madigan, Thomas M., to Itek Corporation. Ink transfer roller for printing presses. 3,877,368, Cl. 101-148.000.

Madsen, Henning Schmidt; and Gudmandsen, Robert, to Fonofilm Industri A/S. Replaceable stylus for stereophonic phonograph pickup. 3,878,342, Cl. 179-100.41D.

Madsen, Kristian Dahl, to Allmanna Svenska Elektriska Aktiebolaget. Turbo-generator, the rotor of which has a direct liquid-cooled winding. 3,878,413, Cl. 310-59.000.

Maeder, Arthur: *See—*
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Maeno, Hiroo; and Matsumoto, Yoshiyuki, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Finished paper for casings and process of preparing same. 3,877,968, Cl. 162-176.000.

Mahle GmbH: *See—*
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Maillet, Wilfrid G., to Communications Satellite Corporation. Reference station failure in a TDMA system. 3,878,339, Cl. 179-15.0BS.

Maisey, Roy Frederick; and Singer, Michael, to Imperial Chemical Industries Limited. Biocide. 3,877,890, Cl. 44-76.000.

Maitan, Francesco; and Vannucchi, Cosimo. Apparatus for simultaneous bilateral phototherapy (pan irradiation) of new-born children. 3,877,437, Cl. 128-373.000.

Majeau, Henrie Lionel, to Boeing Company, The. Passive identification system. 3,878,528, Cl. 343-6.5SS.

Mamedov, Rufat Gadzhibala Ogly: *See—*
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Manson, Peter St. C., to Motorola, Inc. Tuning system for AM/FM receivers. 3,878,467, Cl. 325-316.000.

Marcal Paper Mills, Inc.: *See—*
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Marchello, Maurice J.; and Bassett, Gordon H., to United States Gypsum Company. Panel attachment system. 3,877,195, Cl. 52-741.000.

Marcor Housing Systems, Incorporated: *See—*
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Maret, Ray H., to Maret, Ray H.; and Cobble, Henry R. Process for preparing extracts of aloe vera. 3,878,197, Cl. 260-236.500.

Marie, Georges R. P. Mode transformer for light or millimeter electromagnetic waves. 3,877,789, Cl. 350-147.000.

Marie, Gerard J. M.; Donjon, Jacques; LePape, Auguste Raymond; and Monod, Bernard, to U.S. Philips Corporation. Method of and device for electronically compensating for mechanical stresses in an optic relay. 3,878,328, Cl. 178-7.50D.

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Kormer, Vitaly Abramovich; Jufa, Tatyana Lvovna; Babitsky, Boris Davidovich; Markova, Viktoriya Vladimirovna; Lobach, Mark Iosifovich; Kovalev, Nikolai Fedorovich; Poletaeva, Irina Alexandrovna; Simanova, Nadezhda Pavlovna; Lapuk, Irina Moiseevna; and Kholodnitskaya, Galina Vasilievna, 3,878,182.

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Maroschak, Ernest J. Method of apparatus for drilling holes in tubes. 3,877,831, Cl. 408-32.000.

Marpha Societe a Responsibilite Limitee dite Societe d'Etude et d'Exploitation de Marques: *See—*
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Marten, Hans-Friedrich, to Schloemann-Siemag Aktiengesellschaft. Rolling mill including means for compensating for roll bending. 3,877,270, Cl. 72-8.000.

Martin, Barry Forester; and Roberts, Edward David, to U.S. Philips Corporation. Methods of producing phosphosilicate glass patterns. 3,877,980, Cl. 357-7.000.

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Martin, Edward C., to International Fiber Optics. Decorative structure utilizing optical fibers. 3,878,503, Cl. 240-10.00L.

Martin, Elmore Louis. Herbicidal compounds, compositions and methods. 3,877,926, Cl. 71-105.000.

Martin, Elmore Louis, to du Pont de Nemours, E. I., and Company. Herbicidal compositions and methods. 3,877,927, Cl. 71-105.000.

Martin, Eugene Ray, to Stauffer Chemical Company. Acrylate-functional polysiloxane polymers. 3,878,263, Cl. 260-825.000.

Martin, Frederick Raymond Patrick, to Lucas Electrical Company Limited, The. Vehicle headlamps. 3,877,104, Cl. 15-250.020.

Martin Marietta Corporation: *See—*
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Martinko, Matyas; Martos, Ferenc; and Hazai, Karoly, to Banyaszati Kutato Intezet Varpalotai Szenbanyak; and Orszagos Banyagepgyarto Vallalat. Advanceable shield support. 3,877,234, Cl. 61-45.00D.

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Masuda, Minoru, to Yehan Numata. Accuracy regulating means for a linear micrometer. 3,877,149, Cl. 33-166.000.

Masuda, Naosuke; Shimoura, Yoshiyuki; and Konishi, Hideo, to Jidosha Kiki Kabushiki Kaisha. Power steering system having a varying resistance responsive to running speed. 3,877,540, Cl. 180-79.20R.

Masuda, Takao, to Fuji Photo Film Co., Ltd. Heat developable photographic material. 3,877,943, Cl. 96-67.000.

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Mathey, Francois; and Bensoam, Jean, to Institut National de Recherche Chimique Appliquee. Process for producing fluorinated organic compounds containing a difluoromethylene group from compounds comprising at least one carbonyl function. 3,878,246, Cl. 260-653.800.

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Matsui, Kazuo; Kasugai, Hiroshi; Matsuya, Kuni; and Aizawa, Hiroyasu, to Mitsubishi Chemical Industries Limited. N-substituted-Δ'-tetrahydrophthalimides. 3,878,224, Cl. 260-32€.00R.

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Matsumura, Yasuo; and Maruyama, Kunio, to Japan Exlan Company Limited. Method for accelerating lactonization. 3,878,177, Cl. 260-79.3MU.

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Matuschek, Richard W.; and Garth, William, Jr., to Univiron Corporation. Structural corner post. 3,877,194, Cl. 52-730.000.

Maucher, Paul, to Luk Lamellen Und Kupplungsbay GmbH. Clutch bearing having radial and axial free play. 3,877,557, Cl. 192-98.000.

Mauell, Helmut. Lattice assembly, e.g. for mosaic tiles, electrical circuit elements and display systems. 3,877,189, Cl. 52-475.000.

May, Edward T.: *See—*
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Mayer-Mader, Rudolf; and Hohmann, Gerhard, to Bayer Aktiengesellschaft. Emulsion polymerisation of chloroprene with diethylhydroxyamines as inactivator. 3,878,181, Cl. 260-92.300.

Mayr, Hubert; Presoly, Elfriede; Weinrotter, Ferdinand; Muller, Walter; Stern, Gerhard; and Frohner, Walter Mizzi, deceased (by Frohner, Maria, administrator), to Chemie Linz Aktiengesellschaft. Process for regulating or influencing the growth and metabolism of plants. 3,877,923, Cl. 71-88.000.

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McClelland, Chester S. Remote monitoring attachment for a cash register. 3,878,531, Cl. 340-366.00R.

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McCloskey, John T.; and Villavicenio, Eduardo J., to Process Evaluation and Development Corporation. Cleaning apparatus. 3,877,110, Cl. 19-66.00R.

McCollum, Fenwick Harris, to Del Mar Engineering Laboratories. Stress balanced extendible boom structure. 3,877,544, Cl. 182-141.000.

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McCord Corporation: *See—*
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McCutchan, Blaine R., II. Leg support for skiers. 3,877,158, Cl. 36-2.5AL.

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McDonald, Robert R. Gravity operated electromagnetically controlled gate. 3,877,174, Cl. 49-334.000.

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McEwen, Robert George: *See—*
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McFarland, Charles M.; Lerman, Theodore B.; and Rockwood, Alan C., to General Electric Company. Recovery of cobalt-rare earth alloy particles by hydration-disintegration in a magnetic field. 3,878,000, Cl. 148-108.000.

McFarland, Charles M.: *See—*
Lerman, Theodore B.; and McFarland, Charles M., 3,877,999.

McGinniss, Vincent Daniel, to SCM Corporation. Photopolymerization of pigmented binders using combinations of organic carbonyls and halogenated naphthalenes. 3,878,075, Cl. 204-159.230.

McGlothlin, Raymond E.; and Cox, Tom E., to Dresser Industries, Inc. Drilling fluids, additives therefor, and stabilization methods therefor. 3,878,111, Cl. 252-8.50M.

McGuire, Joseph C., to McDonnell Douglas Corporation. Controlled flow pattern vent structure. 3,877,487, Cl. 138-42.000.

McInerney, Edward J., to General Electric Company. Polyolefin composition resistant to hot alkaline solutions. 3,878,266, Cl. 260-897.00A.

McKeage, Roy A., to Price Brothers Company. Pipe testing system. 3,877,293, Cl. 73-49.100.

McKenney, Hunter R.: *See—*
Bradshaw, Harry; McKenney, Hunter R.; and McKenzie, Roland W., 3,877,141.

McKenney, John D.: *See—*
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McKenzie, Roland W.: *See—*
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McKinzie, Kenneth W.: *See—*
Fahey, Robert W. C.; and McKinzie, Kenneth W., 3,877,723.

McLain, Perry E., to McDonald, Daniel E.; and Espeland, Terrance I. Foldable bicycle rack. 3,877,622, Cl. 224-42.03B.

McLaughlin, Gerald R.: *See—*
Loomis, Russell M.; Bertram, Leroy W.; McLaughlin, Gerald R.; and Gaikowski, Michael D., 3,877,393.

McLaughlin, John D., to Ellock International, Inc. Two-key locking system. 3,877,266, Cl. 70-280.000.

McNeilly, Walter S.: *See—*
Cody, John F.; and Sites, George W., 3,877,206.

McSparran, Lloyd Wilfred, to General Electric Company. Excitation control arrangement for diesel-electric propulsion systems. 3,878,400, Cl. 290-14.000.

Medlock, Homer L. Sensor device and alarm circuit for fuel tanks. 3,878,507, Cl. 340-63.000.

Meece, Meredith Wayne: *See—*
Greene, Robert Raymond; Jacob, Hans Oscar; and Meece, Meredith Wayne, 3,877,842.

Meeks, Thomas, to Perdue, Matt, a part interest. Internal combustion engine pollution control apparatus. 3,877,450, Cl. 123-119.00E.

Meier, Rene: *See—*
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Meinert, Norbert: *See—*
Broemer, Heinz; and Meinert, Norbert, 3,877,953.

Meisel, Nicolas M., to DCA Food Industries Inc. Apparatus for loading and unloading a hot oven. 3,877,588, Cl. 214-21.000.

Mekhtiev, Sekhrab Iskenderogly; Dalin, Mark Alexandrovich; Polchaev, Ramis Abdurab Ogly; and Mamedov, Rufat Gadzhibala Ogly. Method of producing methacrylonitrile. 3,878,238, Cl. 260-465.300.

Melamed, Sidney: *See—*
Broadbent, Robert; Melamed, Sidney; and Minton, Robert G., 3,877,965.

Melead, James J., to Beloit Corporation. Multiple melt chamber extrusion die. 3,877,857, Cl. 425-133.500.

Melead, James J., to Beloit Corporation. Process for matting melt blow microfibers. 3,878,014, Cl. 156-167.000.

Melzer, Werner: *See—*
Bock, Hartmut; Melzer, Werner; Schroeder, Helmut; and Schupmehl, Leo, 3,877,820.

Mendelsohn, Max: *See—*
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Mentone, Pat F.: *See—*
Carr, John M.; and Mentone, Pat F., 3,878,065.

Mentrier, Michel; and Pichery, Henri, to Compagnie Pechiney. Standard specimens for use in emission spectrography. 3,877,811, Cl. 356-85.000.

Meraikib, Mohammed: *See—*
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Merck & Co., Inc.: *See—*
Christensen, Burton G.; and Firestone, Raymond A., 3,878,203.
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Merck Patent Gesellschaft mit beschrankter Haftung: *See—*
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Mergerian, Dickron: *See—*
Bozanic, Donald A.; Mergerian, Dickron; and Minarik, Ronald W., 3,878,529.

Merrell, Jimmy D.; Spurgeon, Samuel J., Jr.; and Dunaway, J. C., to United States of America, Army. Electrical-to-fluidic interface device. 3,877,486, Cl. 137-831.000.

Mesiah, Raymond N.: *See—*
Carlson, Ronald H.; Mesiah, Raymond N.; and Chancey, Harold R., 3,878,208.

Mesnet, Gerard; Dadon, Georges; Le Guennec, Raymond; Remon-Beauvais, Philippe; Pivet, Yann; and Le Luherne, Armand, to Etat Francais represente par le Delegue Ministresiel pour l'Armement. Mooring device. 3,877,664, Cl. 244-115.000.

Messmer, Robert C., to J. M. Schmidt Precision Tool Co., Inc. Air gage cartridge. 3,877,292, Cl. 73-37.500.

Mesta Machine Company: *See—*
Petros, Andrew J., 3,877,276.

Metailler, Roger, to Richier. Assemblage of pieces of a metal frame. 3,877,192, Cl. 52-638.000.

Metal Craft (1970) Limited: *See—*
Bouman, Wim John Michael, 3,877,088.

Metastein Forschungsgesellschaft mbH: *See—*
Wustefeld, Bernd, 3,877,954.

Meyer, Alfred L.: *See—*
Anetsberger, Richard J.; and Meyer, Alfred L., 3,877,615.

Meyer, Arthur L., Jr.: *See—*
Hohl, Francis R.; Meyer, Arthur L., Jr.; and Faust, Robert W., 3,877,283.

Meyer, Helmut P., to Bendix Corporation, The. Igniter plug. 3,878,418, Cl. 313-118.000.

Meyer, Rolf: *See—*
Kulle, Elfriede; and Meyer, Rolf, 3,877,794.

Mica Corporation, The: *See—*
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Micheizler, Albert J.: *See—*
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Michel, Alfred; and Koch, Christian, to Siemens Aktiengesellschaft. Catalytically active substance for the conversion of higher hydrocarbons comprising Co, La, Ni, and U. 3,878,130, Cl. 252-458.000.

Michellone, Giancarlo; and Palazzetti, Mario, to Fiat Societa per Azioni. Method of and installation for braking so as to prevent the wheels from skidding. 3,877,757, Cl. 303-21.00F.

Michigan Chemical Corporation: *See—*
Anderson, Arnold L., 3,878,165.

Miciukiewicz, Joseph F., to Pitney-Bowes, Inc. Sheet orienting apparatus. 3,877,696, Cl. 271-227.000.

Mickowski, John. Ram velocity measuring apparatus. 3,878,375, Cl. 235-151.320.

Midwest Research Institute: *See—*
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Miesterfeld, Frederick O.: *See—*
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Mikic, Borivoje B.: *See—*
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Mikome, Koichi; Matsuda, Yoshihiro; and Namiki, Yoshiyuki, to Fujitsu Limited. Semiconductor device. 3,878,554, Cl. 357-65.000.

Miller, Anderson, to United States of America, Army. Method for determining tightness of film shrunk over a container or an assembly of containers. 3,877,302, Cl. 73-159.000.

Miller, Charles C.; and Rumberger, William E., to Boeing Company, The. Metal chip detecting filter device. 3,878,103, Cl. 210-243.000.

Miller, Charles H.; and Mayrl, Jose A. Lightweight reinforced structural material. 3,878,278, Cl. 264-45.300.

Miller, George L.; and Barthel, Horst K. F., to Oil Base, Inc., by said Miller; and Oil Base Germany G.m.b.H., by said Barthel. Clay-free aqueous sea water drilling fluids containing magnesium oxide or calcium oxide as an additive. 3,878,110, Cl. 252-8.50B.

Miller, James G.: *See—*
Tramuta, Salvatore S.; Miller, James G.; and Knox, William M., 3,877,519.

Miller, Lloyd E., Jr. 4-Stroke displacement gas turbine engine or pump. 3,877,442, Cl. 123-8.450.

Miller, Matthew N., to Fairchild Industries, Inc. Serving cart. 3,877,744, Cl. 296-22.000.

Miller, Shelond M., to Tesco Engineering Company. Method and apparatus for protecting electrical field cables against rodent damage. 3,878,444, Cl. 317-262.00S.

Milligan, Daniel J., to N. L. Industries, Inc. Treatment of fermented beverages to increase chill haze stability. 3,878,300, Cl. 426-16.000.

Mills, Kenneth N., to Kenco Engineering Company. Heat actuated valve. 3,877,476, Cl. 137-75.000.

Minami, Toshihiro: *See—*
Shimizu, Kiyoshi; Minami, Toshihiro; and Niina, Eiji, 3,877,281.

Minarik, Ronald W.: *See—*
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Minton, Robert G.: *See—*
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Mischutin, Vladimir, to White Chemical Corporation. Flame retardants for blends of natural and synthetic fibers. 3,877,974, Cl. 428-290.000.

Misenheimer, Lindsay S.; and Babb, John D., to J. P. Stevens & Co., Inc. Process for the continuous crushing of velvet. 3,877,118, Cl. 26-2.00R.

Mitchell, Wallace F., to Ammco Tools, Inc. Dust collector. 3,877,900, Cl. 55-366.000.

Mitsche, Roy T.; Hayes, John C.; Wilhelm, Frederick C.; and Rausch, Richard E., to Universal Oil Products Company. Multimetallic catalyst composite. 3,878,125, Cl. 252-441.000.

Mitsubishi Chemical Industries Limited: *See—*
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Mitsubishi Denki Kabushiki Kaisha: *See—*
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Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
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Mitsubishi Petrochemical Company Limited: *See—*
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Mitsui Polychemicals, Co., Ltd.: *See—*
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Mitsui Shipbuilding and Engineering Co. Ltd.: *See—*
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Miura, Mitsutoshi: *See—*
Hayashi, Yasuo; and Miura, Mitsutoshi, 3,878,052.

Mixon, James Lenhart, Jr.; and Beinhaur, Ernest Lloyd, to AMP Incorporated. Resilient cover assembly having a removable external support member and method of assembling the same. 3,878,320, Cl. 174-135.000.

Miyake, Sanae, to Jintan Terumo Co., Ltd. Fluid collection device. 3,877,465, Cl. 128-2.00F.

Miyamoto, Reiji: *See—*
Tatsumi, Tetsujiro; Miyamoto, Reiji; Matsui, Yutaka; Kazama, Seiji; Takemura, Tadao; and Kanayama, Hikoyoshi, 3,877,969.

Miyano, Masateru: *See—*
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Miyawaki, Sentaro. Steam trap. 3,877,479, Cl. 137-185.000.

Miyazako, Takushi: *See—*
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Mladek, Milos: *See—*
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Moberly, Charles W., to Phillips Petroleum Company. Arylene sulfide polymers. 3,878,176, Cl. 260-79.100.

Mochizuki, Tadao; and Kawada, Koichi, to said Mochizuki, by said Kawada. Contaminated water treating apparatus. 3,878,097, Cl. 210-151.000.

Mochizuki, Tadao: *See—*
Mochizuki, Tadao; and Kawada, Koichi (assors. to said Mochizuki, by said Kawada), 3,878,097.

Moe, Walter, to Aurora Products Corporation. Combined game of chance and skill. 3,877,700, Cl. 273-119.00R.

Moffatt, John G.; and Jones, Gordon H., to Syntex (U.S.A) Inc. Novel phosphorylated phosphonium ylids. 3,878,194, Cl. 260-211.50R.

Mohaupt, Udo H., to University of Waterloo, The. High pressure rotary coupling. 3,877,732, Cl. 285-94.000.

Mohelnicky, Josef: *See—*
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Monckton, Walter John Bruce. Mounting of outboard motors. 3,877,667, Cl. 248-4.000.

Moncrief, J. D. Holder for fowl. 3,877,109, Cl. 17-44.100.

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Montesi, Edward N., to Dart Industries Inc. Pastry tool or implement. 3,877,143, Cl. 30-114.000.

Montgomery, Gary V.; and Julian, Randall K., to Sunbeam Plastics Corporation. Child-resistant closure for liquid containers. 3,877,597, Cl. 215-221.000.

Montor, Karel. Attention-level analyzer. 3,877,466, Cl. 128-2.10B.

Moody, Asa Carlyle, Jr.; Kenward, Richard George; and Shiver, James William, to Allied Chemical Corporation. Polymer intrinsic viscosity control. 3,878,379, Cl. 235-151.120.

Moore, Charley H. Panel positioning apparatus. 3,877,582, Cl. 214-1.0SW.

Moore, Earl P., Jr.: *See—*
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Moore, Fred W.; and Vermillion, Herbert E., to Texaco Inc. Motor fuel composition. 3,877,887, Cl. 44-58.000.

Moore, William Percy, to Allied Chemical Corporation. Method of producing a pelleted slow-release NPN feed for ruminants from waste polysaccharide materials. 3,878,304, Cl. 426-69.000.

Moorhead, William L.; and Kahn, Manfred, to Sprague Electric Company. Asymmetrical dual PTCR package for motor start system. 3,878,501, Cl. 338-22.00R.

Morey, Booker W., to Occidental Petroleum Corporation. Separation process for flint, amber, and green glass particles from a mixture of the three colors. 3,877,578, Cl. 209-215.000.

Morgan, Barrie O.; Branscome, Kenneth M.; Goode, George E.; and Atchley, John Q. Digital cryptographic system and method. 3,878,331, Cl. 178-22.000.

Morgan, Barrie O.; Branscome, Kenneth M.; Goode, George E.; and Atchley, John Q. Digital crytographic system and method. 3,878,332, Cl. 178-22.000.

Morgan, Robert E., to General Motors Corporation. Hydraulic valve lifter. 3,877,446, Cl. 123-90.550.

Morimoto, Akira: *See—*
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Morin, Boris Pavlovich: *See—*
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Morin, Edmond A.; and Peterson, Hal D., to Colorado School of Mines Research Institute. Process for recovering copper from aqueous solutions. 3,878,286, Cl. 423-24.000.

Moritani, Yoichi: *See—*
Okano, Akira; Moritani, Yoichi; and Murakami, Masahiro, 3,878,475.

Morris, Robert C., to Multifax Corporation. Egg tray. 3,877,599, Cl. 217-26.500.

Morrison, Howard J.; and Nix, Donald F., to Marvin Glass & Associates. Combination of a water gun and bow. 3,877,611, Cl. 222-78.000.

Morrison-Knudsen Company: *See—*
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Morton-Norwich Products, Inc.: *See—*
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Mosler Safe Company, The: *See—*
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Moss, Lester I., to Mosstype Corporation. Automatic chemical measuring and mixing machine. 3,877,682, Cl. 259-7.000.

Moss, Philip Hotchkiss; and Gipson, Robert Malone, to Jefferson Chemical Company, Inc. Preparation of n-(tertiaryaminoalkyl) acrylamides. 3,878,247, Cl. 260-561.00N.

Mosstype Corporation: *See—*
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Mote, Neil H.: *See—*
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Motoren-und Turbinen-Union Munich GmbH: *See—*
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Motorola, Inc.: *See—*
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Manson, Peter St. C., 3,878,467.
Shanahan, Thomas W., 3,877,134.
Wilson, Richard W., 3,877,122.

Motoyama, Hisashi. Automatic temperature and humidity regulating apparatus. 3,877,637, Cl. 236-44.00C.

Mounce, George Ralph; and Sainsbury, John Douglas. Digital down-count timer. 3,877,216, Cl. 58-39.500.

MPC Corporation: *See—*
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Mueller Co.: *See—*
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Mueller, Kurt Hugo: *See—*
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Muenchinger, Herman G., to Research Engineering & Manufacturing, Inc. Lobular screw with means for improved stress distribution. 3,877,339, Cl. 85-9.00R.

Muller, James Carroll, to Southwire Company. Pour pot manipulator. 3,877,509, Cl. 164-278.000.

Muller, Walter: *See—*
Mayr, Hubert; Presoly, Elfriede; Weinrotter, Ferdinand; Muller, Walter; Stern, Gerhard; and Frohner, Walter Mizzi, deceased, 3,877,923.

Muller, Wolfgang, to Chemische Werke Huls Aktiengesellschaft. Method for the separation of acetic acid by extractive rectification. 3,878,241, Cl. 260-541.000.

Muller, Wolfgang Dieter; Hart, Ulrich; and Lippert, Axel, to Bayer Aktiengesellschaft. Charging of kiln with granular material. 3,878,287, Cl. 423-153.000.

Multifax Corporation: *See—*
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Munday, James F.; Ryan, John W.; Sloop, Conrad B.; and Baynes, William R., to Mattel, Inc. Vehicle-triggered toy vehicle accelerator. 3,877,169, Cl. 46-1.00K.

Munsey, Robert J., to Westinghouse Electric Corporation. Connector assembly and support post. 3,877,191, Cl. 52-632.000.

Murakami, Masahiro: *See—*
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Murao, Sawao; Satoi, Shuzo; Kuwana, Noriaki; Fukumura, Masayuki; and Kawamura, Tamio. Pepsin inhibitors and preparation thereof. 3,878,185, Cl. 260-112.500.

Murato, Kenichi; Sema, Katsutoshi; Wakao, Mitsuru; Kobayashi, Yoshinori; and Hara, Koichi, to Japanese National Railways; and Kayabakogyokabushiki-kaisha. Rolling stock accelerator. 3,877,385, Cl. 104-167.000.

Murayama, Naohiro; and Oikawa, Takao, to Kureha Kagaku Kogyo Kabushiki Kaisha. Process for production of polyvinylidene fluorine resin film. 3,878,274, Cl. 264-2.000.

Murphy, Joseph A., to Southwire Company and National Steel Corporation. Apparatus for and method of producing metal. 3,878,070, Cl. 204-64.00R.

Murphy, Robert E. Non-spillable liquid dispensing system. 3,877,614, Cl. 222-209.000.

Murray, Paul Francis, to Pennwalt Corporation. Feeder for multicavity compression molding apparatus. 3,877,862, Cl. 425-448.000.

Murray, William M. Methods and apparatus for external fixation of bone fractures. 3,877,424, Cl. 128-92.00A.

Musillo, Robert G. Locking ring for jewelry. 3,877,250, Cl. 63-23.000.

Muska, William A. Electrical safety test apparatus for detecting leakage current tripping current and proper grounding. 3,878,458, Cl. 324-51.000.

Muskovac, Nicholas G., to Vectrol Inc. Solid state voltage control system for electrostatic precipitators. 3,877,896, Cl. 55-105.000.

Myer, Jon H., to Hughes Aircraft Company. Movable magnetic domain random access three-dimensional memory array. 3,878,542, Cl. 340-174.0TF.

Mylchreest, George Dudley; and Wythe, Frederick Joseph, to Emhart Corporation. Control system for glassware molding machine and method of molding glass. 3,877,915, Cl. 65-29.000.

Mylec, Inc.: *See—*
Chapdelaine, Romeo, 3,877,077.

N. L. Industries, Inc.: *See—*
Milligan, Daniel J., 3,878,300.

N.V. Hollandse Signaalapparaten: *See—*
Van der Werf, Herman Antonius, 3,877,214.

Nachbur, Hermann; and Maeder, Arthur, to Ciba-Geigy AG. Process for the manufacture of phosphorus-containing condensation products, the products and their use as flameproofing agents. 3,878,245, Cl. 260-553.00R.

Nadelson, Jeffrey: *See—*
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Nagahashi, Katsuo: *See—*
Tawarada, Takeshi; Okaniwa, Shigeru; and Nagahashi, Katsuo, 3,877,884.

Nagashima, Shinichiro; Shimamune, Hiroyuki; and Tsuneda, Terukuni. Process for preparing liquid developer for electrostatic images. 3,878,120, Cl. 252-62.10L.

Nagatomo, Shigeru; Hori, Kiyotaka; Miyazako, Takushi; and Sakaguchi, Shinji, to Fuji Photo Film Co., Ltd. Method of forming photographic images. 3,877,942, Cl. 96-50.00R.

Nahas, Robert S.; and Simone, Andre Armand. Integrated production of olefins and coke. 3,878,088, Cl. 208-50.000.

Nakagawa, Sadao, to Nippon Kogaku K.K. Zoom lens casing. 3,877,793, Cl. 350-187.000.

Nakajima, Hiroyuki, to Konan Electric Co., Ltd. Solenoid operated four port valve. 3,877,483, Cl. 137-625.640.

Nakamura, Shotaro: *See—*
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Nakamura, Tadashi. Electromagnetic plunger pump. 3,877,840, Cl. 417-307.000.

Nakamura, Tadashi. Electromagnetic plunger pump. 3,877,841, Cl. 417-311.000.

Nakanishi Metal Co., Ltd.: *See—*
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Nakaoka, Kazuhide: *See—*
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Namiki, Yoshiyuki: *See—*
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Naphtachimie: *See—*
Durand, Daniel; Avaro, Michel; and Mangin, Pierre, 3,878,124.

Narang, Rajendra K. Workpiece clamp and tool shielding device and combination thereof with a tool applying apparatus. 3,877,298, Cl. 73-81.000.

Narushima, Uraji: *See—*
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Nash, Lawrence M., to Johnson & Johnson. Cloth holders and cleaning implements utilizing the same. 3,877,103, Cl. 15-147.00R.

Nath, Dilip K., to General Electric Company. Preparation of rare-earth oxysulfide phosphors. 3,878,119, Cl. 252-301.40S.

National Acceptance Company of America: *See—*
Hackemann, William; and Renegar, Charles Gwin, 3,877,626.
Nebgen, William H. Brayton cycle system with refrigerated intake and condensed water injection. 3,877,218, Cl. 60-39.050.
Nellis, David C., to Itek Corporation. System for detecting given changes in monitored light intensity. 3,878,398, Cl. 250-561.000.
Nelson, Howard I., to Crompton & Knowles Corporation. Terry motion for looms. 3,877,492, Cl. 139-26.000.
Nelson, Robert L. Handle-latch. 3,877,738, Cl. 292-68.000.
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Nemoto, Isao, to Kabushiki Kaisha Suwa Seikosha. Quartz crystal timepiece having tuning capacitor device. 3,878,408, Cl. 310-8.100.
Neskora, Daniel R.; Sliepcevich, Cedomir M.; and Brown, Robert L. Continuous preparation of pure metals by gaseous reduction. 3,877,931, Cl. 75-0.5AA.
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Newell, Cyril; Walden, Mark Philip Gray; and Yeomans, John Stephen, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Stores carriers. 3,877,343, Cl. 89-1.50R.
Newell, George David: *See—*
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Newman, James W., to Windings, Inc. Withdrawal of flexible material from a package with twistless payout. 3,877,661, Cl. 242-163.000.
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Nidola, Antonio: *See—*
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Nielsen, Arnold T., to United States of America, Navy. Monofunctional diferrocenyl compounds. 3,878,233, Cl. 260-439.0CY.
Nihon Denshi Kabushiki Kaisha: *See—*
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Niina, Eiji: *See—*
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Nimmersjo, Gunnar, to Allmanna Svenska Elektriska Aktiebolaget. Arrangement for detecting the direction of a fault from a measuring point. 3,878,460, Cl. 324-52.000.
Nippon Electric Company, Limited: *See—*
Kikuchi, Yoshiyasu; Kawada, Hiroaki; Yamaguchi, Takanori; Ito, Tadashi; and Tsuiki, Hideo, 3,878,509.
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Nitzsche, Siegfried; Bauer, Ignaz; Deubzer, Bernward; and Seidel, Wolfgang, to Wacker-Chemie GmbH. Process for the manufacture of intermediates for the production of molded electric insulating elements. 3,878,281, Cl. 264-86.000.
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Noa, Fritz, to Schiess Aktiengesellschaft. Tool support with tool slide vertically displaceable therein, with a tool exchanging device associated with said tool slide. 3,877,329, Cl. 82-2.00R.
Nocito, Bernabe; and Frohmberg, Clifford R., to Xynetics, Inc. Compensating positioning system. 3,878,411, Cl. 310-12.000.
Noel, Eugene M., to Schmidt, Albert S., Sr. Muffin scoring machine. 3,877,330, Cl. 83-6.000.
Noguchi, Kazuo: *See—*
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Nomura, Tsutomu; and Sakai, Masakazu, to Sumitomo Shipbuilding & Machinery Co., Ltd. Electric dust collector. 3,877,898, Cl. 55-122.000.
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Norman, Robert M., to Norman Offshore Services, Inc. Underwater trenching apparatus guidance system. 3,877,237, Cl. 61-72.400.
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Norwood, Eugene R., to Norwood Machinery & Equipment Co. Device for printing boxes moving on a conveyor. 3,877,367, Cl. 101-44.000.
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Novak, Frank A.; and Dolejs, Anthony H. Monetary paper validator receptacle. 3,877,768, Cl. 312-341.00R.
Novak, Richard A., to Advanced Product Engineering Corporation. Filtration system. 3,877,905, Cl. 55-404.000.
Novak, Warren D., to Mosler Safe Company, The. Optical viewing system. 3,878,330, Cl. 178-7.920.
NTN Toyo Bearing Company Ltd.: *See—*
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Nyitrai, Ernest S. Pneumatic tired roller skate. 3,877,710, Cl. 280-11.230.
Nyul, Paul, to RCA Corporation. Modularized laser diode assembly. 3,878,556, Cl. 357-81.000.
O. M. Scott and Sons Company, The: *See—*
Timmons, Richard J.; and Gallant, William E., 3,877,921.
Obayashi, Nobuharu; and Sakashita, Tetsuzi, to Kabushiki Kaisha Kawai Gakki Seisakusho. Electronic musical instrument capable of transposition. 3,877,337, Cl. 84-1.010.
Obenaus, Helmut, to Ernst Fehrer Gesellschaft mbH & Co. K.G. Textilmaschinenfabrik u. Stahlbau. Needle punching apparatus. 3,877,121, Cl. 28-4.00R.
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O'Bryant, Mary Louetta. Method for making an article conformable to a variably shaped cylindrical surface. 3,877,079, Cl. 2-243.00B.

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Ochi, Minoru; and Shibata, Fumio, to Ataka Construction Co., Ltd. Incinerator feeding system. 3,877,398, Cl. 110-8.00R.

Ochiai, Michihiko; Aki, Osami; Morimoto, Akira; Okada, Taiiti; and Masuda, Katsutada, to Takeda Chemical Industries, Ltd. Cephalosporin derivatives. 3,878,204, Cl. 260-243.00C.

Ochmann, Rudolf, to U.S. Philips Corporation. Circuit arrangement for measuring the filament emission current of a cathode-ray or x-ray tube. 3,878,455, Cl. 324-20.0CR.

Oda, Toshiro. Presser bar unit for sewing machines. 3,877,404, Cl. 112-240.000.

Oddicini, Giuseppe: *See*—
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O'Donnell, Leopold Henry, to Canada, Her Majesty the Queen in right of, as represented by the Secretary of State. Method of recording the first frame in a time index system. 3,877,799, Cl. 352-92.000.

Oesterle, Kurt Martin. Process and apparatus for determining the infinitesimal-hardness behaviour of synthetic materials, coatings and ductive materials. 3,877,297, Cl. 73-81.000.

Ogle, David G., to Beckman Instruments, Inc. Mounting for liquid chromatograph column. 3,878,099, Cl. 210-198.00C.

Ohio State University Research Foundation, The: *See*—
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Ohms, Edward J.; and Schexnayder, Lawrence F., to Caterpillar Tractor Company. Displacement sensitive automatic diverter valve. 3,877,345, Cl. 91-412.000.

Ohms, Edward J.; Stanley, James M.; and Schexnayder, Lawrence F., to Caterpillar Tractor Company. Emergency steering by wheel braking action. 3,877,537, Cl. 180-6.300.

Oikawa, Takao: *See*—
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Oil Base Germany G.m.b.H.: *See*—
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Okai, Sakuo, to Nippon Paint Co., Ltd. Photopolymer printing plates and coated relief printing plates. 3,877,939, Cl. 96-36.300.

Okamoto, Miyoshi; Hikota, Toyohiko; and Shimizu, Kitao, to Toray Industries, Inc. Needle board. 3,877,120, Cl. 28-4.00R.

Okaniwa, Shigeru: *See*—
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Okano, Akira; Moritani, Yoichi; and Murakami, Masahiro, to Mitsubishi Denki Kabushiki Kaisha. System for reproducing carrier wave for n differential phase shift keyed modulated wave. 3,878,475, Cl. 331-12.000.

Oki Electric Industry Co., Ltd.: *See*—
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Okino, Yoshihiro; Kamogawa, Toshiro; and Kato, Makoto, to Matsushita Electric Industrial Co., Ltd. Speckle reduction in holography. 3,877,776, Cl. 350-3.500.

Okumura, Shinji: *See*—
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Olcott, Eugene L., to Atlantic Research Corporation. Acicular silicon carbide dispersion in pyrolytic graphite matrix for use in biomedical implants. 3,877,080, Cl. 3-1.000.

Oligschlaeger, Frederick F., to Dickey-John Corporation. Apparatus for spraying liquid product. 3,877,645, Cl. 239-155.000.

Olin Corporation: *See*—
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Olk, Gunter, to Siemens Aktiengesellschaft. Method of making a hypersensitive semiconductor tuning diode. 3,878,001, Cl. 148-186.000.

Olsen, John O., to Reid, Middleton & Associates, Inc. Floating breakwater system. 3,877,233, Cl. 61-5.000.

Olson, Harry S.; and Haataja, Bruce A. Method for treating wood materials with lignosulfonic acids. 3,877,976, Cl. 427-317.000.

Olstowski, Franciszek; and Parrish, Donald B., to Dow Chemical Company, The. Rapid-setting non-elastomeric polyurethane compositions prepared in the presence of an organic carbonate. 3,878,156, Cl. 260-30.40N.

Olstowski, Franciszek; and Parrish, Donald B., to Dow Chemical Company, The. Non-elastomeric polyurethane compositions. 3,878,157, Cl. 260-33.8UB.

Olstowski, Franciszek, to Dow Chemical Company, The. Process for preparing radar reflecting mass. 3,878,524, Cl. 343-18.00B.

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O'Neill, Raymond J.; and Newell, George David. Crib block and structure. 3,877,236, Cl. 61-47.000.

O'Neill, Wilbur J., to Westinghouse Electric Corporation. Underwater breathing apparatus. 3,877,425, Cl. 128-142.000.

Ono, Kaoru; Kamada, Masashi; Ohisuru, Hiroyuki; Wakabayashi, Yoshikazy; Nakamura, Shotaro; and Yamada, Tadashi, to Mitsubishi Jukogyo Kabushiki Kaisha; and Idemitsu Petrochemical Co., Ltd. Reactors for highly viscous materials. 3,877,881, Cl. 23-285.000.

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Opderbeck, Fritz; Franzen, Volker; and Dessauer, Guido, to Feldmuhle Anlagen-nind Produktionsegesellschaft mit beschrankter Haftung. Stiff light-weight paper. 3,878,038, Cl. 162-167.000.

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Orr, Robert S., to Caterpillar Tractor Company. Lubrication system for vehicle final drive. 3,877,545, Cl. 184-6.300.

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Orth, Edward D.; Van Bennekom, Carl F.; and MacPherson, Ronald H., to General Electric Company. Taut band suspension system with strain relief. 3,878,462, Cl. 324-154.000.

Osakabe, Yoshio, to Sony Corporation. Audio signal transmitting system. 3,878,472, Cl. 330-124.00R.

Osborne, David Richard Duke: *See*—
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Ostlund, Bernt; and Juhlin, Lars-Erik, to Allmanna Svenska Elektriska Aktiebolaget. Thyristor circuit. 3,878,451, Cl. 321-27.00R.

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Jackson, Per-Olof; Juhlin, Lars-Erik; and Ostlund, Brent, 3,878,448.

Ostwald, Fritz, to ITT Industries, Inc. Wheel suspension for the steered wheels of vehicles including a disc brake. 3,877,716, Cl. 280-96.300.

Oswald, Alexis A.; and Valint, Paul L., to Ciba-Geigy AG. Asymmetric o,s-dialkyl-o-[(phenyl)-vinyl]-thiophosphates. 3,878,268, Cl. 260-957.000.

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Overy, John; and Broad, Michael John, to Plessey Handel und Investments A.G. Plural-cylinder internal combustion engines equipped with an exhaust driven turbocharger. 3,877,230, Cl. 60-606.000.

Owens, Andrew C., to Lambert, Albert D., a part interest. Pressure vise. 3,877,690, Cl. 269-265.000.

Owens-Corning Fiberglas Corporation: *See*—
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Ozelli, Riza-Nur; Klement, Gunter; and Lieske, Edgar, to Henkel & Cie GmbH. Adhesion assistants for producing composite bodies by vulcanization. 3,878,134, Cl. 260-4.00R.

P. R. Mallory and Co., Inc.: *See*—
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Palazzo, Ferdinando, to S.I.R.M.A. Societa Italiana Refrattari Marghera Azionaria. Suspended crowns of industrial furnaces, and refractory elements for making such crowns. 3,877,402, Cl. 110-99.00R.

Palazzo, Ferdinando, to S.I.R.M.A. Societa Italiana Refrattari Marghera Azionaria S.p.A. Modular support for carrying ceramic products during baking. 3,877,869, Cl. 432-258.000.

Palm, John W.; and Berry, Kay L., to Amoco Production Company. Apparatus for handling ammonia-containing acid gas streams. 3,877,879, Cl. 23-262.000.

Palmer, John P., to General Dynamics Corporation. Optical radiation transmission and detection device. 3,878,105, Cl. 250-211.00R.

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Panzer, Hans Peter; and McAdams, Louis Vincent, to American Cyanamid Company. Polymers containing cyclo-1,1-diallylguanidine linkages and wet strength paper having a content thereof. 3,878,170, Cl. 260-64.000.

Paoli, Charles Lucien. Vehicle with an air cushion lifting system. 3,877,542, Cl. 180-120.000.

Paolinelli, Antonio: *See—*
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Pargeter, John K.; Diran, Loris M.; and Hennion, Francis J., to International Nickel Company, Inc., The. Metallurgical addition product. 3,877,933, Cl. 75-129.000.

Parilla, Arthur R. Electronic sound effects apparatus. 3,877,363, Cl. 179-100.1VC.

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Silver, Stanley M., 3,877,630.

Payne, Harold James William. Glass fiber reinforced gypsum building components and method. 3,878,009, Cl. 156-41.000.

Payne, Roger A.: *See—*
Steckel, Elmer A.; Schaffer, William G.; and Payne, Roger A., 3,878,024.

Peck, Christopher; and Skinner, George A. Tear strip for packages. 3,877,633, Cl. 229-51.0AS.

Pecsar, Raymond Ernest; and Wadsworth, Brent Earl, to Varian Associates. Automatic sampler apparatus. 3,877,310, Cl. 73-425.600.

Pedersen, Norman E., to Panametrics, Inc. Doppler signal processor using quadrature reference signals. 3,878,526, Cl. 343-7.700.

Peerless of America, Incorporated: *See—*
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Peltz, Hanns-Heinz: *See—*
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Pembrook, John D.; Edwards, Byron N.; and Burch, Darrell E., to Philco-Ford Corporation. Electronically compensated rotating gas cell analyzer. 3,878,107, Cl. 250-343.000.

Pennell, Rolla J.: *See—*
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Pennella, Filippo, to Phillips Petroleum Company. Regeneration of ruthenium hydride complex isomerization catalysts. 3,878,122, Cl. 252-411.00R.

Pennwalt Corporation: *See—*
Murray, Paul Francis, 3,877,862.

Penny, Robert Noel. Apparatus for effecting controllable vaporization of liquid. 3,877,863, Cl. 431-75.000.

Perdue, Matt: *See—*
Meeks, Thomas, 3,877,450.

Pestka, John August, to Illinois Tool Works Inc. Cover clip. 3,877,112, Cl. 24-73.00B.

Peters, David W.: *See—*
Spivey, Joseph Wesley; Peters, David W.; and Nemechik, Joseph F., 3,877,089.

Peterson, Carl R. Filtration apparatus. 3,877,906, Cl. 55-404.000.

Peterson, Donald A. Filter assembly. 3,877,903, Cl. 55-381.000.

Peterson, Hal D.: *See—*
Morin, Edmond A.; and Peterson, Hal D., 3,878,286.

Petrick, Michael; Cutting, John C.; Amend, William E.; and Cole, Roger L., to United States of America, Energy Research and Development Administration. Two-phase liquid-metal magnetohydrodynamic (MHD) generator. 3,878,410, Cl. 310-11.000.

Petrina, Robert J., to Bruce Industries, Inc. Remotely controlled discharge lamp dimming module. 3,878,431, Cl. 315-195.000.

Petros, Andrew J., to Mesta Machine Company. Mill roll changing system including a cantilevered roll assembly. 3,877,276, Cl. 72-238.000.

Pettibone Corporation: *See—*
Bisinella, Angelo J.; and Nosek, Roy F., 3,877,673.

Pezzoli, Silvestro: *See—*
Vargiu, Silvio; and Pezzoli, Silvestro, 3,878,159.

Pharris, John A., to E Z Painter Corporation. Paint roller core. 3,877,123, Cl. 29-116.00R.

Phelps, Harold E., to Harold Phelps, Inc. Air filter assembly with a controlled auxiliary air inlet. 3,877,908, Cl. 55-419.000.

Philadelphia Gear Corporation: *See—*
Haas, Leonard L.; and Schlosberg, Seymour, 3,877,706.

Philco-Ford Corporation: *See—*
Pembrook, John D.; Edwards, Byron N.; and Burch, Darrell E., 3,878,107.

Phillips Petroleum Company: *See—*
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Fuller, Edward N., 3,878,092.
Gardner, Lloyd E., 3,878,261.
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Williams, Ralph P.; and Louthan, Rector P., 3,878,117.
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Phillips, Wendell Gary, to Monsanto Company. Substituted alpha, alpha-dichloro-methane-sulfenyl chlorides. 3,878,248, Cl. 260-558.00S.

Piccolo, Luigi; Paolinelli, Antonio; and Ghirga, Marcello, to Societa Italiana Resine S.I.R. S.p.A. Process for the production of finely powdered aluminum trichloride of uniform particle size. 3,878,293, Cl. 423-495.000.

Pichery, Henri: *See—*
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Pierce-All Manufacturing Limited: *See—*
Todd, Sidney Clarke, 3,877,689.

Pierre, Donna J. Word game. 3,877,703, Cl. 273-130.00E.

Pierse, Dermot John. Dual magnification microscope. 3,877,779, Cl. 350-33.000.

Piesch, Ernst: *See—*
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Pigisch, Franz: *See—*
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Storace, Anthony; and Zucker, Fredric E., 3,877,531.
Storace, Anthony; and Sette, Paul R., 3,878,025.

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Pivet, Yann: *See—*
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Plaskon, Edward S., to Plummer, Walter A. Cable splice assembly. 3,878,317, Cl. 174-92.000.

Plasser, Franz; and Theurer, Josef. Mobile apparatus for distributing and shaping the ballast of a railroad bed. 3,877,160, Cl. 37-104.000.

Plastik Devices, Inc.: *See—*
Steckler, Robert, 3,878,175.

Plessey Handel und Investments A.G.: *See*—
Overy, John; and Broad, Michael John, 3,877,230.
Plicchi, Gianni. Artificial respiration system. 3,877,467, Cl. 128-2.080.
Plourde, Joseph Rolland. Rail fish joint and method of making the same. 3,877,641, Cl. 238-234.000.
Plummer, Walter A.: *See*—
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Pneumatic Scale Corporation: *See*—
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Vergobbi, Robert W., 3,877,198.
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Pojurowsky, Leon, to Sogeref. Insecticide varnish. 3,877,951, Cl. 106-15.0AF.
Polaroid Corporation: *See*—
Cianci, Arthur, 3,878,545.
Polchaev, Ramis Abdurab Ogly: *See*—
Mekhtiev, Sekhrab Iskenderogly; Dalin, Mark Alexandrovich; Polchaev, Ramis Abdurab Ogly; and Mamedov, Rufat Gadzhibala Ogly, 3,878,238.
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Popescu, Corneliu: *See*—
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Potin, M. Philippe: *See*—
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Potter, David W.; and Topping, Frederick V., to Trans Canada Pipelines Limited. Pipeline signalling systems and techniques. 3,878,453, Cl. 324-3.000.
Potters Industries, Inc.: *See*—
Cerbo, Thomas A., 3,877,918.
Irgens-Bergh, Ib Von, 3,877,914.
PPG Industries, Inc.: *See*—
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Pretsch, Hubert: *See*—
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Price Brothers Company: *See*—
McKeage, Roy A., 3,877,293.
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Bradley, Gordon Frank; and Price, David, 3,877,957.
Price, Stephen E.; and Gomm, Thiel J., to Inex, Inc. Apparatus for detecting flaws using an array of photo sensitive devices. 3,877,821, Cl. 356-237.000.
Pridgen, Herman Speight: *See*—
Weaver, Max Allen; and Pridgen, Herman Speight, 3,878,190.
Priestley, Ronald, to Mass Transfer Limited. Gas-liquid contact apparatus. 3,878,272, Cl. 261-112.000.
Process Evaluation and Development Corporation: *See*—
McCloskey, John T.; and Villavicenio, Eduardo J., 3,877,110.
Process Research, Incorporated: *See*—
Haswell, David B.; and Eisenmann, John L., 3,878,086.
Procter & Gamble Company, The: *See*—
Damico, Ralph Anthony; and Boggs, Robert Wayne, 3,878,305.
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Produits Chimiques Ugine Kuhlmann: *See*—
Brouard, Claude Marie Henri Emile; and Ficht, Paulette Gisele, 3,878,158.
Prosen, Edward J., to United States of America, Commerce. Plastic cell for mixing two liquids or a liquid and a solid. 3,877,877, Cl. 23-259.000.
Pruett, Roy L.: *See*—
Walker, Wellington E.; Brown, Earle S.; and Pruett, Roy L., 3,878,214.
Walker, Wellington E.; Brown, Earle S.; and Pruett, Roy L., 3,878,290.
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Pugsley, Peter C., to Crosfield Electronics Limited. Colour scanners for image reproduction. 3,878,559, Cl. 358-75.000.
Pungs, Wolfgang: *See*—
Junger, Hans; Weissenfels, Franz; and Pungs, Wolfgang, 3,877,967.
Putnam, John P.: *See*—
Mabie, Norman H.; and Putnam, John P., 3,877,713.
Putnam, Paul S. Subsea completion and rework system for deep water oil wells. 3,877,520, Cl. 166-.600.
Putti, George, to Dyform Concrete Prestressed Ltd. Extrusion machine for making articles of cement-like material. 3,877,860, Cl. 425-380.000.
Puyplat, Olivier, to Cibie Projecteurs. Twin illumination type headlight. 3,878,389, Cl. 240-41.35A.
Quester, Karl Wilhelm, to Wilh. Quester. Device for feeding a plurality of cigarette machines with cut tobacco. 3,877,586, Cl. 214-17.0CA.
Quinting, Franz G. R.; and Stoffel, Robert W., to International Engineering Service, Inc. Pushbutton release connector. 3,877,115, Cl. 24-230.00R.
R&D Metals: *See*—
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Rabinow, Jacob, to United States of America, Army. Proximity Fuze. 3,877,377, Cl. 102-70.20P.
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Rader, Robert R., to Wirtz Manufacturing Company, Inc. Metal valve for battery grid casting machine. 3,877,620, Cl. 222-537.000.
Radiation Limited: *See*—
Longworth, Alfred, 3,877,478.
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Saveliev, Alexandr Ivanovich; Brezulova, Elizaveta Andreevna; Moskalev, Alexei Gavrilovich; Pavlov, Gely Georgievich; Sharychenkov, Alexandr Alexeevich; Avdeev, Vladimir Vladimirovich; Pastukhov, Valentin Tikhonovich; Ermilov, Grigory Andreevich; Drozdov, Nikolai Andreevich; Radovitsky, Vladimir Petrovich; and Parnev, Vasily Antonovich, 3,877,211.
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Ralston, Wilson. Temperature stabilized photometer for kinetic analysis. 3,877,817, Cl. 356-180.000.
Ram Partitions Limited: *See*—
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Ramage, William W., to Westinghouse Electric Corporation. Signal processing and reproducing method and apparatus for single video frame reproduction with associated audio. 3,878,560, Cl. 360-10.000.
Ramos, Henry John: *See*—
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Rampel, Guy G., to General Electric Company. Cell having anode containing silver additive for enhanced oxygen recombination. 3,877,985, Cl. 136-24.000.
Randpalu, Adu; Edel, Alfred; Bryce, Rodney Harold; and Bruinsma, Bote Gosse, to Dominion Engineering Works, Limited. Reel bar loading system. 3,877,654, Cl. 242-65.000.
Rapid-American Corporation: *See*—
Locascio, Jack J., 3,877,439.
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Duchatellier, Bernard Charles, 3,877,342.
Rapoport, Morris; and Sullivan, David Lee, to du Pont de Nemours, E. I., and Company. Preparation of cyclododecatriene. 3,878,258, Cl. 260-666.00B.
Rapp, Robert A.: *See*—
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Rasmussen, Keith O., to Hek Manufacturing Company, Inc. Split back dental chair apparatus. 3,877,751, Cl. 297-410.000.
Rasumoff, David L. Catheter placement device. 3,877,429, Cl. 128-214.400.
Raum Italia: *See*—
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Rauter, Gunther; Bohlke, Gunther; and Weissberger, Gunther, to Siemens Aktiengesellschaft. Electrical switching apparatus having the armature and contact bridge carrier flexibly coupled together. 3,878,491, Cl. 335-270.000.

Ravault, Frank Ernest George, to Foseco International Limited. Treatment of permeable materials. 3,877,973, Cl. 264-44.000.

Rawdon, Daniel J., to Hawkeye Steel Products, Inc. Float valve. 3,877,482, Cl. 137-446.000.

Raymond, Anthony John. Metallic coating of metal tubes and similar work pieces. 3,877,975, Cl. 427-345.000.

Raymond Lee Organization, Inc., The: *See—*
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Redford, David Arthur, to Texaco Exploration Canada Ltd. Dense solvent demulsification method for bituminous petroleum-water emulsions. 3,878,090, Cl. 208-188.000.

Reding, John T.; and Riley, Robert L., Jr., to Dow Chemical Company, The. Aluminum sacrificial anode. 3,878,081, Cl. 204-197.000.

Reel Precision Manufacturing Corporation: *See—*
Wahlstedt, Robert L., 3,877,274.

Regensburger, Paul J.; and Jakubowski, James J., to Xerox Corporation. Novel xerographic plate containing photoinjecting polynuclear quinone pigments. 3,877,935, Cl. 96-1.500.

Reichenbacher, Paul H.; and Forsythe, Theresa M., to Universal Oil Products Company. Vinylation of aromatic compounds. 3,878,074, Cl. 204-158.00R.

Reichhold-Albert-Chemie Aktiengesellschaft: *See—*
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Reid, John D.: *See—*
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Reiersdal, Olav. Drill wagon for transporting and erecting rock drilling rigs. 3,877,528, Cl. 173-23.000.

Reigel, Stanley A.: *See—*
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Reimann, Hans, to Schering Corporation. Process for the preparation of garamine derivatives. 3,878,193, Cl. 260-210.00R.

Reiner, Lawrence L. Tethered ball poker game. 3,877,699, Cl. 273-119.00R.

Reinhardt, Robert M.; Kullman, Russell M. H.; Cashen, Norton A.; and Reid, John D., to United States of America, Agriculture. Odor free hydroxymethanesulfonic acid. 3,878,123, Cl. 252-426.000.

Reist, Walter, to Ferag AG. Installation for conveying printed products arriving in an overlapping formation. 3,877,564, Cl. 198-103.000.

Reiter, Gordon S.; Rubin, Charles P.; Swanson, Ronald V.; Burns, Bernard F., Jr.; and Iorillo, Anthony J., to Hughes Aircraft Company. Isolated frame on platform stabilized by spinning body. 3,877,316, Cl. 74-5.500.

Reiter, Gordon S.; Rubin, Charles P.; Swanson, Ronald V.; Burns, Bernard F., Jr.; and Iorillo, Anthony J. Isolated frame on platforms stabilized by spinning body. 3,877,662, Cl. 244-1.0SA.

Remkes, Elmer R.: *See—*
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Remon-Beauvais, Philippe: *See—*
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Renner Company, The: *See—*
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Rensin, Ernest Isaac; and Schnerk, Tom, to International Telephone and Telegraph Corporation. Radiant energy receiver circuits. 3,878,527, Cl. 343-7.700.

Research Engineering Company: *See—*
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Research Engineering & Manufacturing, Inc.: *See—*
Muenchinger, Herman G., 3,877,339.

Resler, Edwin L., Jr., to Cornell Research Foundation, Inc. Combustion means for a low-pollution engine. 3,877,229, Cl. 60-597.000.

Reusser, Robert E.: *See—*
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Rexnord Inc.: *See—*
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Reyes, Cesar D. Anchoring system used in post stressing concrete. 3,877,113, Cl. 24-115.00M.

Reynolds, Gordon S.: *See—*
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Rheinische Braunkohlenwerke AG: *See—*
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Rhone-Poulenc S.A.: *See—*
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Rhone-Progil: *See—*
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Rhudy, John S.: *See—*
Knight, Bruce L.; Rhudy, John S.; and Gogarty, William B., 3,877,522.

Riccius, Rolf; and Sadowski, Herbert, to Vereinigte Flugtechnische Werke-Fokker GmbH. Fuselage configuration. 3,877,665, Cl. 244-130.000.

Rice, George A.: *See—*
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Rice, James M., to Mica Corporation, The. Selective etchant for nickel/phosphorus alloy. 3,878,006, Cl. 156-3.000.

Rice, Matt F.: *See—*
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Richard, Wilton. Culinary articles and apparatus for retrieving and/or sorting the same. 3,877,577, Cl. 209-73.000.

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Richardson, Kay R., to United States of America, Navy. Voltage-tunable, seven-decade, continuously-variable oscillator. 3,878,483, Cl. 331-111.000.

Richardson-Merrell Inc.: *See—*
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Richier: *See—*
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Richtzenhain, Hermann; and Stephan, Rudolf, to Dynamit Nobel AG. Stabilization of 1,1,1-trichloroethane with a four component system. 3,878,256, Cl. 260-652.50R.

Ricoh Co., Ltd.: *See—*
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Rieger, Francis C.: *See—*
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Riffe, Delmar R.: *See—*
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Rigge, Ronald J.: *See—*
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Rihn, William Joseph, to Kinemetrics, Inc. Strong motion accelerograph with self-starter and electrical as well as light outputs. 3,877,296, Cl. 73-71.100.

Riley, Robert L., Jr.: *See—*
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Riparbelli, Carlo, to United States of America, Navy. Layered projectile for close-in weapon system. 3,877,380, Cl. 102-92.400.

Ripstein, Max Aronowicz. Method and means of treating synthetic fibers of brushes. 3,877,753, Cl. 300-21.000.

Rist, Michel, to Societe Anonyme Francaise Du Ferodo. Assembly cage for free-wheel or bearing. 3,877,555, Cl. 192-45.000.

Roach, William Ronald, to RCA Corporation. Deformable mirror light valve and method of making the same. 3,877,791, Cl. 350-161.000.

Robb, Ian E.; and Clanton, John S., to International Telephone and Telegraph Corporation. Electro-optical transmission line. 3,878,397, Cl. 250-551.000.

Robert Bosch G.m.b.H.: *See—*
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Roberts, Edward David: *See—*
Martin, Barry Forester; and Roberts, Edward David, 3,877,980.

Roberts, George W., to Allis-Chalmers Corporation. Method of checking horizontal spacings on a crankshaft. 3,877,151, Cl. 33-180.00B.

Roberts, Thomas Ernest Edwin; and Barnard, John Norman, to Lucas Aerospace Limited. Apparatus for detecting rapid variations in an output quantity. 3,878,402, Cl. 307-235.000.

Robertson, George N., II: *See—*
Dolbeer, William R.; and Robertson, George N., II, 3,877,526.

Robins, Milton, to Packaging Techniques, Inc. Keyed fixed door lock. 3,877,261, Cl. 70-90.000.

Robinson, Thomas L., to Astronics Corporation. Large liquid crystal displays and method of producing them. 3,877,790, Cl. 350-160.0LC.

Roch, Gerald V., to Hurco Manufacturing Company, Inc. Automatic shearing method. 3,877,332, Cl. 83-13.000.

Roche, Gerard; and Dumas, Bernard, to Societe Nationale des Poudres et Explosifs. Method of encapsulation by coacervation, and the substances obtained. 3,878,121, Cl. 252-316.000.

Roche, William J.; and Wroblewski, Theodore, to GTE Sylvania Incorporated. Integral fluorescent-incandescent lamp structure. 3,878,416, Cl. 313-3.000.

Rochelle, James M. Ultrasonic temperature telemetry system. 3,878,502, Cl. 340-5.00R.

Rocklin, Isadore J. Device for applying electrode to a workpiece for spark treatment of the workpiece. 3,878,351, Cl. 219-69.00G.

Rockwell International Corporation: *See—*
Hayes, Cecil L.; and Davis, Walter C., 3,877,813.
Smith, Walter S.; and Mazur, Joseph E., 3,877,353.
Warren, Robert G.; and Whitcomb, Eugene C., 3,878,005.

Rockwood, Alan C.: *See—*
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Rodger, Keith, to De Laval Separator Company, The. Milking station. 3,877,419, Cl. 119-14.030.

Rodgers, Franklin A., to Pactide Corporation. Distillation apparatus and process. 3,878,054, Cl. 203-11.000.

Rodgers, Thurman J. Bipolar integrated circuit and method. 3,878,552, Cl. 357-49.000.

Rodgers, Wayne E. Thin film thickness measuring apparatus using an unbalanced inductive bridge. 3,878,457, Cl. 324-34.0TK.

Roeser, John O., to Otto Engineering, Inc. Electrical switch. 3,878,347, Cl. 200-67.00D.

Rogachev, Jury Petrovich: *See—*
Alexeev, Semen Mikhailovich; Arkhangelsky, Mark Nikolaevich; Baldin, Valentin Pavlovich; Braverman, Boris Solomonovich; Vasiliev, Jury Dmitrievich; Gorjushev, Vladimir Petrovich; Zelvinsky, Alexandr Lvovich; Rogachev, Jury Petrovich; Severin, Gai Ilich; Spassky, Jury Andreevich; Spolitak, Boris Vasilievich; Ushinin, Vladimir Vladimirovich; and Utyamushev, Rustam Ismailovich, 3,877,427.

Rogovin, Zakhar Alexandrovich: *See—*
Samoilov, Vladimir Ivanovich; Livshits, Rem Markovich; Morin, Boris Pavlovich; and Rogovin, Zakhar Alexandrovich, 3,878,144.

Rohde, Michael F.: *See—*
Matta, Michael S.; Kelley, Joe A.; and Rohde, Michael F., 3,878,043.

Rohde, Vernon C.; and Blum, Josef, to du Pont de Nemours, E. I., and Company. Cell washing centrifuge apparatus and system. 3,877,634, Cl. 233-14.00R.

Rohe, Hermann: *See—*
Schabacher, Werner; Guth, Hans; Rohe, Hermann; and Keller, Wolfgang, 3,878,294.

Rohm and Haas Company: *See—*
Broadbent, Robert; Melamed, Sidney; and Minton, Robert G., 3,877,965.

Rokop Engineering: *See—*
Rokop, Joseph; and Hughes, Geoffrey W., 3,877,612.

Rokop, Joseph; and Hughes, Geoffrey W., to Rokop Engineering. Ladle handling apparatus for continuous casting. 3,877,612, Cl. 222-129.000.

Rollei-Werke Franke & Heidecke: *See—*
Adamski, Gunter, 3,878,546.

Roncillat, Michel; and Hareng, Michel, to Thomson-CSF. Multiplexed liquid-crystal display device. 3,878,537, Cl. 340-324.00M.

Ronnen, Uri G., to Westinghouse Electric Corporation. System and method for operating a turbine-powered electrical generating plant in a sequential mode. 3,878,401, Cl. 290-40.000.

Roque, Ramon Masriera. Knitting method and apparatus utilizing cylinder and dial needles. 3,877,256, Cl. 66-24.000.

Rosback, Donald H., to Universal Oil Products Company. Method of manufacturing a zeolitic absorbent. 3,878,127, Cl. 252-455.00Z.

Rosback, Donald H., to Universal Oil Products Company. Method for manufacturing an adsorbent useful for olefin separation. 3,878,128, Cl. 252-455.00Z.

Rosback, Donald H., to Universal Oil Products Company. Method of manufacturing a zeolitic adsorbent useful for aromatic separation. 3,878,129, Cl. 252-455.00Z.

Rosenhahn, Lothar; and Bergthaller, Peter, to Agfa-Gevaert Aktiengessellschaft. Light-sensitive photographic material with cationic polyurethane mordant. 3,877,945, Cl. 96-84.00A.

Ross, Donald R., to U-S Safety Trolley Corporation. Electric power distribution system with power pick-up carriage. 3,877,553, Cl. 191-49.000.

Ross, Paul Lawrence, Sr. Exhaust supercharger. 3,877,447, Cl. 123-119.00A.

Roth, Michael: *See—*
Nitzsche, Siegfried; Pirson, Ewald; and Roth, Michael, 3,877,956.

Rothman, Edward S.; and Serota, Samuel, to United States of America, Agriculture. Process for the preparation of enol esters of straight chain carboxylic acids. 3,878,230, Cl. 260-410.90N.

Rothweiler, Richard C., to Square D Company. Electromagnetic relay having a printed circuit board connection between the contacts and radio type plug-in connector. 3,878,489, Cl. 335-199.000.

Roussel, Daniel: *See—*
Couderc, Pierre; Roussel, Daniel; and Croisier, Jean, 3,878,226.

Roux, Marcel Henri Rene. Tubular construction elements assembled by interlocking parts. 3,877,825, Cl. 403-233.000.

Rovac Corporation, The: *See—*
Edwards, Thomas C., 3,877,245.

Rowell, Stephen Royce; and Hogan, David Charles, to Eastman Kodak Company. Auto bias control apparatus. 3,877,413, Cl. 118-7.000.

Roye, Cleveland E. Diffusion band riveting method. 3,878,356, Cl. 219-150.00V.

Royka, Stephen F.; and Martin, Robert G., to Xerox Corporation. Responsive answer system. 3,877,155, Cl. 35-9.00R.

RTE Corporation: *See—*
Link, Edwin A., 3,878,314.

Rubens, Louis C., to Dow Chemical Company, The. Cushioning and materials therefor. 3,878,133, Cl. 260-2.5BE.

Rubin, Charles P.: *See—*
Reiter, Gordon S.; Rubin, Charles P.; Swanson, Ronald V.; Burns, Bernard F., Jr.; and Iorillo, Anthony J., 3,877,316.
Reiter, Gordon S.; Rubin, Charles P.; Swanson, Ronald V.; Burns, Bernard F., Jr.; and Iorillo, Anthony J., 3,877,662.

Rubin, Howard: *See—*
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Keegan, James J.; Patel, Girish; and Rubin, Howard, 3,878,138.

Rubin, Isaac D.: *See—*
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Rucker Company, The: *See—*
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Rudgwick Brickworks Company Limited: *See—*
Laker, Patrick Allen, 3,877,866.

Rudine, Kenneth M.: *See—*
Felter, John V.; and Rudine, Kenneth M., 3,877,357.

Rueckert, Hans J., to Bray Oil Company. Overbased sulfonates. 3,878,116, Cl. 252-33.400.

Rufer, Clemens; Ahrens, Hans; Biere, Helmut; Schroder, Eberhard; Gerhards, Erich; Schillinger, Ekkehard; Losert, Wolfgang Felix; and Loge, Olaf. Blood sugar lowering sulfamoyl pyrimidines and asymmetrical carbon atom. 3,878,212, Cl. 260-256.50R.

Rufer, Clemens: *See—*
Ahrens, Hanns; Biere, Helmut; Rufer, Clemens; Losert, Wolfgang Felix; Loge, Olaf; Schillinger, Ekkehard; Schroder, Eberhard; and Gerhards, Erich, 3,878,213.

Ruffner, Donald J.: *See—*
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Rumberger, William E.: *See—*
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Runge, Peter Klaus, to Bell Telephone Laboratories, Incorporated. Phase locked loop. 3,878,474, Cl. 331-10.000.

Rusher, Robert L.: *See—*
Bever, James N.; Moore, Earl P., Jr.; and Rusher, Robert L., 3,878,034.

Ruthner, Gerlinde: *See—*
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Ryan, John W.: *See—*
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Ryan, Robert C.: *See—*
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Ryazanov, Evgeny Makarovich: *See—*
Leonidov, Nikolai Konstaninovich; Levin, Lev Yakovlevich; Ipatov, Petr Platonovich; Krasavtsev, Nikolai Ivanovich; Shtepa, Evgeny Dmitrievich; Gerasimenko, Jury Markovich; Degtyarev, Valery Stepanovich; Rybtsov, Alexandr Fedorovich; Tankin, Anatoly Dmitrievich; Sukhorukov, Alexandr Efimovich; Kovylin, Mikhail Mikhailovich; Markovsky, Jury Lvovich; Ryazanov, Evgeny Makarovich; Altukhov, Vyacheslav Alexeevich; Kononov, Valentin Alexeevich; and Yasakov, Evgeny Ivanovich, 3,877,686.

Rybar, Vaclav: *See—*
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Rybtsov, Alexandr Fedorovich: *See—*
Leonidov, Nikolai Konstaninovich; Levin, Lev Yakovlevich; Ipatov, Petr Platonovich; Krasavtsev, Nikolai Ivanovich; Shtepa, Evgeny Dmitrievich; Gerasimenko, Jury Markovich; Degtyarev, Valery Stepanovich; Rybtsov, Alexandr Fedorovich; Tankin, Anatoly Dmitrievich; Sukhorukov, Alexandr Efimovich; Kovylin, Mikhail Mikhailovich; Markovsky, Jury Lvovich; Ryazanov, Evgeny Makarovich; Altukhov, Vyacheslav Alexeevich; Kononov, Valentin Alexeevich; and Yasakov, Evgeny Ivanovich, 3,877,686.

S.I.R.M.A. Societa Italiana Refrattari Marghera Azionaria: *See—*
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S.I.R.M.A. Societa Italiana Refrattari Marghera Azionaria S.p.A.: *See—*
Palazzo, Ferdinando, 3,877,869.

Sacrini, Egeo; and Cavallotti, Claudio, to B. F. Goodrich Company, The. Vulcanizing elastomers and crosslinking, plastomers with organic tetraperoxides. 3,878,161, Cl. 260-42.420.

Sadashige Fancy Plywood Industries Co., Ltd.: *See—*
Sadashige, Takeshi, 3,878,016.

Sadashige, Takeshi, to Dantani Plywood Co., Ltd.; and Sadashige Fancy Plywood Industries Co., Ltd. Process for producing sliced veneer. 3,878,016, Cl. 156-265.000.

Sadowski, Herbert: *See—*
Riccius, Rolf; and Sadowski, Herbert, 3,877,665.

Sager, Bert W., to Paramount Wedding Ring Co., Inc. Economical stretchable precious-metal rings having enclosed annular voids. 3,877,249, Cl. 63-15.000.

Saines, George S.: *See—*
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Sainsbury, John Douglas: *See—*
Mounce, George Ralph; and Sainsbury, John Douglas, 3,877,216.

Saint-Andre, Robert Eugene, to Sofrance, S.A. Apparatus for measurement of the amount of impurity in a fluid. 3,878,461, Cl. 324-61.00R.

St. Clair, Theodore A., to Textron Inc. Compensated rotary gas meter. 3,877,305, Cl. 73-254.000.

Saito, Takeo: *See—*
Komiya, Sanpei; and Saito, Takeo, 3,877,851.

Sakaguchi, Shinji: *See—*
Nagatomo, Shigeru; Hori, Kiyotaka; Miyazako, Takushi; and Sakaguchi, Shinji, 3,877,942.

Sakai, Masakazu: *See—*
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Sakashita, Tetsuzi: *See—*
Obayashi, Nobuharu; and Sakashita, Tetsuzi, 3,877,337.

Sakurai, Katsuo; and Yamawaki, Takeshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Rear seat passenger-protecting seat back structure for automotive vehicle. 3,877,749, Cl. 297-216.000.

Saleck, Wilhelm; Balle, Gerhard; and Himmelmann, Wolfgang, to Agfa-Gevaert Aktiengesellschaft. Photographic silver salt emulsions comprising polymers with disulfonimide groups. 3,877,944, Cl. 96-67.000.

Saliger, Joseph E. Marble game table with peripheral pockets and cushions. 3,877,702, Cl. 273-125.00R.

Salt, Frederick George: *See—*
Whitehead, Jack; and Salt, Frederick George, 3,877,929.

Salz, Jack: *See—*
Falconer, David Duncan; Mueller, Kurt Hugo; Salz, Jack; and Spaulding, David Adams, 3,878,468.

Samoilov, Vladimir Ivanovich; Livshits, Rem Markovich; Morin, Boris Pavlovich; and Rogovin, Zakhar Alexandrovich. Method for preparing cellulose graft copolymers utilizing tervalent iron initiator. 3,878,144, Cl. 260-17.4GC.

Sandford, W. Nelson: *See—*
Carvell, Bernard J.; Sandford, W. Nelson; and Ryan, Robert C., 3,877,740.

Sandlin, William C. Linear thruster. 3,877,348, Cl. 92-13.000.

Sandoz Ltd., (a/k/a Sandoz AG): *See—*
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Sandoz-Wander, Inc.: *See—*
Anderson, Paul L., 3,878,253.
Houlihan, William J.; and Nadelson, Jeffrey, 3,878,215.

Sanford, Allan. Containers for protecting copper and silver coins and the like from corrosion. 3,877,571, Cl. 206-83.000.

Santa Fe International Corporation: *See—*
Chang, Nuke Ming; and Remkes, Elmer R., 3,877,238.

Santomango, Anthony; and Hatheway, Nicholas N., Jr., to Artronics Corporation. Electronic interval timer. 3,878,370, Cl. 235-92.00T.

Sarti, Walter, to Sebac S.p.A. Suspension unit. 3,877,687, Cl. 267-8.00R.

Sasaki, Tomohisa: *See—*
Tsuchiya, Kenji; Ito, Yoji; Matsushita, Yasuhiro; Tsuji, Hideshi; and Sasaki, Tomohisa, 3,877,867.

Sasaki, Toshiaki: *See—*
Itakura, Eiji; and Sasaki, Toshiaki, 3,877,666.

Sasame, Takao; and Takahashi, Kentaro, to Nippon Piston Ring Co., Ltd. Relative combination of apex seal and rotor housing in rotary piston internal combustion engine. 3,877,854, Cl. 418-178.000.

Satchell, Fred E.: *See—*
Ferguson, Thomas B.; Burlis, Norbert W.; and Satchell, Fred E., 3,877,434.

Sato, Fukuji, to Sato Koki Co., Ltd. Photographic flashlight apparatus with improved automatic light termination means. 3,878,433, Cl. 315-241.00P.

Sato Koki Co., Ltd.: *See—*
Sato, Fukuji, 3,878,433.

Sato, Mamoru: *See—*
Tanaka, Kazuaki; Ishida, Yasuto; Sato, Mamoru; Kishimoto, Hidetaka; and Yanagi, Kimiyoshi, 3,878,058.

Sato, Masamichi. Reversal liquid developing using a development electrode and corona charging. 3,877,963, Cl. 96-1.0LY.

Sato, Reiji, to Amano Corporation. Automatic feeding printing mechanism for time card. 3,878,516, Cl. 346-82.000.

Sato, Ryozi; Chinu, Yasoyoshi; and Endo, Tatuo, to Japanese Geon Company, Ltd., The. Method of preventing the polymerization of methacrolein. 3,878,250, Cl. 260-601.00R.

Sato, Tomoari: *See—*
Yanagida, Kiyomi; Hirokane, Tadashi; Tsukiyasu, Tadashi; and Sato, Tomoari, 3,878,056.

Sato, Yoshio, to Hitachi, Ltd. Automatic starting device for plant. 3,877,636, Cl. 236-14.000.

Satoi, Shuzo: *See—*
Murao, Sawao; Satoi, Shuzo; Kuwana, Noriaki; Fukumura, Masayuki; and Kawamura, Tamio, 3,878,185.

Saunders, Laurie Albert; and Champion, Michael John, to International Standard Electric Corporation. Electrical connector assembly. 3,877,770, Cl. 339-17.00F.

Saveliev, Alexandr Ivanovich; Brezulova, Elizaveta Andreevna; Moskalev, Alexei Gavrilovich; Pavlov, Gely Georgievich; Sharychenkov, Alexandr Alexeevich; Avdeev, Vladimir Vladimirovich; Pastukhov, Valentin Tikhonovich; Ermilov, Grigory Andreevich; Drozdov, Nikolai Andreevich; Radovitsky, Vladimir Petrovich; and Parnev, Vasily Antonovich. Machine for ringless spinning of textile fibres. 3,877,211, Cl. 57-58.890.

Saveliev, Anatoly Semenovich; Kononenko, Vadim Grigorievich; Raizman, David Alexandrovich; Boguslavsky, Vitaly Alexandrovich; Yatsenko, Sergei Vasilievich; and Strizhenko, Vitaly Evgenievich. Method of control of machine for pulse cutting continuous bar into measured lengths and device for realization thereof. 3,877,331, Cl. 83-13.000.

Scandia Packaging Machinery Company: *See—*
Anderson, Andrew W., 3,877,203.

Scanlon, Raymond M.; and Turner, Stephen, Jr., to TWM Manufacturing Company, Inc., by said Stephen Turner, Jr.; and WDT, by said Stephen Turner, Jr. High strength auxiliary axle suspension system. 3,877,718, Cl. 280-124.00F.

Scesney, George A. Inflatable personnel safety marker. 3,877,096, Cl. 9-14.000.

Schabacher, Werner; Guth, Hans; Rohe, Hermann; and Keller, Wolfgang, to Bayer Aktiengesellschaft. Production of hydrogen fluoride. 3,878,294, Cl. 423-485.000.

Schachte, John J.: *See—*
Kirkham, Edward E.; Zankl, Frank; Stobbe, Richard E.; and Schachte, John J., 3,878,445.

Schaefer, Howard A., to Anchor Hocking Corporation. Reflective roadway marker. 3,877,785, Cl. 350-104.000.

Schaffer, William G.: *See—*
Steckel, Elmer A.; Schaffer, William G.; and Payne, Roger A., 3,878,024.

Schank, Richard L., to Xerox Corporation. Novel silicone elastomers. 3,878,168, Cl. 260-46.50E.

Schauer, Alois, to Siemens Aktiengesellschaft. Method of producing thin tantalum films. 3,878,079, Cl. 204-192.000.

Schaumberg, Guenter, to Societe d'Exploitation des Brevets Neiman. Theft protection device with cylinder lock, particularly steering lock for motor vehicles. 3,877,265, Cl. 70-252.000.

Scheffer, Dietrich: *See—*
Boden, Karl; and Scheffer, Dietrich, 3,877,761.

Scheinpflug, Hans: *See—*
Sirrenberg, Wilhelm; Homeyer, Bernhard; Hammann, Ingeborg; and Scheinpflug, Hans, 3,878,269.

Schell, Charles E., III: *See—*
Weisstuch, Aaron; and Schell, Charles E., III, 3,878,064.

Scherenberg, Hans O., to Daimler-Benz Aktiengesellschaft. Method for the operation of an internal combustion engine with afterburner chamber and installation for carrying out the method. 3,877,222, Cl. 60-274.000.

Schering Corporation: *See—*
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Scheuermann, Werner: *See—*
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Schexnayder, Lawrence F.: *See—*
Ohms, Edward J.; and Schexnayder, Lawrence F., 3,877,345.
Ohms, Edward J.; Stanley, James M.; and Schexnayder, Lawrence F., 3,877,537.

Schiefen, Alfred, to Boge GmbH. Machine for checking effectiveness of vibration dampers or shock absorbers on motor vehicles. 3,877,288, Cl. 73-11.000.

Schiess Aktiengesellschaft: *See—*
Noa, Fritz, 3,877,329.

Schillinger, Ekkehard: *See—*
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Schindel, Arnold, to Singer Company, The. Dual opposite motion extending and retracting ram fluid cylinders. 3,877,349, Cl. 92-53.000.

Schlage Lock Co.: *See—*
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Schlatter, Gerald Lance, to International Telephone and Telegraph Corporation. Densitometer. 3,878,374, Cl. 235-151.300.

Schloemann-Siemag Aktiengesellschaft: *See—*
Marten, Hans-Friedrich, 3,877,270.

Schlosberg, Seymour: *See—*
Haas, Leonard L.; and Schlosberg, Seymour, 3,877,706.

Schmaldienst, Peter: *See—*
Haubner, Georg; Hofer, Walter; and Schmaldienst, Peter, 3,878,452.

Schmeling, Paul R. Pneumatically controlled railroad box car door latching device. 3,877,394, Cl. 105-395.000.

Schmermund, Alfred. Funnelling device for cigarette packing machines. 3,877,201, Cl. 53-151.000.

Schmermund, Alfred. Revolver for a packaging machine. 3,877,35[illegible], Cl. 93-44.10R.

Schmid, Eckhardt: *See—*
Bauer, Kurt; Dorr, Wilhelm; Kohler, Alfred; Weber, Martin; and Schmid, Eckhardt, 3,877,106.

Schmid, Rudolf: *See—*
Gutjahr, Manfred August; Schmid, Rudolf; and Beccu, Klaus Dieter, 3,877,987.

Schmid, Werner, to Societe Industrielle de Brevest et d'Etudes S.I.B.E. Carburetors for internal combustion engines. 3,877,448, Cl. 123-119.00F.

Schmidlin, Fred W., to Xerox Corporation. Induction imaging with in-place development. 3,877,934, Cl. 96-1.400.

Schmidt, Albert S., Sr.: *See—*
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Schmidt, Eike: *See—*
Koopmann, Hans-Jurgen; and Schmidt, Eike, 3,877,346.

Schmidt, Karl-Julius; Hammann, Ingeborg; and Homeyer, Bernhard, to Bayer Aktiengesellschaft. 0-6(7)-Methoxy-quinoxalinyl(2)-(thiono)phosphoric (phosphonic) acid esters and ester amides. 3,878,209, Cl. 260-250.0QP.

Schmidt, Oskar: *See—*
Speck, Walter; and Schmidt, Oskar, 3,877,834.

Schmitt, Edward E.; and Bailey, William J., to American Cyanamid Company. Processes for making shaped articles such as filaments or films from solutions of polyglycolic acid. 3,878,284, Cl. 264-184.000.

Schmitter, Detlev: *See—*
Freitag, Theodor; Peltz, Hanns-Heinz; Pretsch, Hubert; and Schmitter, Detlev, 3,878,555.

Schnabel, Wilhelm J.; and Raes, Maurice C., to Olin Corporation. Chlorine containing methylene bridged diaryl diisocyanates. 3,878,235, Cl. 260-453.0AM.

Schneider, Richard S.; and Wagner, Daniel, to Syva Company. Polypeptide derivatives of amphetamine and analogs for immunoassays. 3,878,187, Cl. 260-121.000.

Schneider, Rupert, to Sandoz Ltd., (a/k/a Sandoz AG). 2-Sulphenylimino-5-amino-1,3-dithianes. 3,878,216, Cl. 260-293.680.

Schnerk, Tom: *See—*
Rensin, Ernest Isaac; and Schnerk, Tom, 3,878,527.

Scholpp, Werner, to Dr. Ing. h.c.F. Porsche Aktiengesellschaft. Reposing furniture. 3,877,750, Cl. 297-284.000.

Schowe, Lester F., Jr., to General Electric Company. Wide-band, voltage controlled oscillator utilizing complimentary metal oxide semiconductor integrated circuits and a constant current MOS-FET field effect transistor. 3,878,482, Cl. 331-108.00D.

Schrempp, Ernst; and Hazelton, Henry S., Jr., to Pitney-Bowes, Inc. Photocopy machine with photoconductor belt and cartridge for photocopying. 3,877,806, Cl. 355-16.000.

Schriefl, Karl-Ekkehard: *See—*
Joschko, Gunter; Schriefl, Karl-Ekkehard; and Winter, Hans-Jurgen, 3,877,705.

Schroder, Eberhard: *See—*
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Schrodt, Heinz: *See—*
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Schroeder, Helmut: *See—*
Bock, Hartmut; Melzer, Werner; Schroeder, Helmut; and Schupmehl, Leo, 3,877,820.

Schubert & Salzer Maschinenfabrik Aktiengesellschaft: *See—*
Canzler, Rolf, 3,877,212.

Schubert, Stuart A.: *See—*
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Schuchmann, Russell P.: *See—*
Van Zeeland, Donald L.; and Schuchmann, Russell P., 3,878,435.

Schultz, Robert F.; and Cook, Edward H., Jr., to Hooker Chemicals & Plastics Corporation. Bipolar electrode. 3,878,084, Cl. 204-290.00F.

Schupmehl, Leo: *See—*
Bock, Hartmut; Melzer, Werner; Schroeder, Helmut; and Schupmehl, Leo, 3,877,820.

Schutz, Bernard R., to Fine Art Pillow and Spec. Corporation. Crib bumper and mattress. 3,877,090, Cl. 5-93.00R.

Schutze, Horst, to Vereinigte Flugtechnische Werke-Fokker GmbH. Air-conditioning for aircraft cabins. 3,877,246, Cl. 62-402.000.

Schuyler Development Corporation: *See—*
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Schwab, Johann; Bohm, Fricdrich; Ruthner, Gerlinde; Buchel, Kurt; and Widtmann, Georg, to Semperit AG. Foamed plastic profile member for hydroponic cultivation and growth of plants. 3,877,172, Cl. 47-1.200.

Schwartz, Hermann. Method and apparatus for spot checking a checkout cashier operation in a store. 3,878,365, Cl. 235-61.70R.

Schweiger, Erwin: *See—*
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Seagle, Charles E.; Reynolds, Gordon S.; Pannier, Karl A., Jr.; and Sorenson, James L., to Sorenson Research Co., Inc. Variable infusion control device. 3,877,428, Cl. 128-214.00R.

Seanor, Donald A.: *See—*
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Seebald, Francis W. Portable storage and/or carrier device. 3,877,766, Cl. 312-284.000.

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Seibert, Joseph George, to Harvey Hubbell Incorporated. Independently removable reflector and filter. 3,878,505, Cl. 240-25.000.

Seidel, Wolfgang: *See—*
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Seidl, Pavel; and Mladek, Milos, to Elitex, Zavody textilniho strojirenstvi generalni reditelstvi. System for measuring the draft of open-end spinning machines. 3,877,209, Cl. 57-34.00R.

Seidl, Pavel, to Elitex, Zavody textilniho strojirenstvi generalni reditelstvi. System for measuring the count and twist of spun yarn in open-end spinning. 3,877,210, Cl. 57-34.00R.

Seifert, Gerd; and Appelt, Gunther, to Siemens Aktiengesellschaft. Method and means for operating x-ray tubes with rotary anodes. 3,878,395, Cl. 250-402.000.

Seiffert, Ulrich: *See—*
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Sekiguchi, Tomoyoshi; and Takeuchi, Yasuhisa, to Nissan Motor Company, Limited; and Atsugi Motor Parts Company, Limited. Vehicle anti-skid device. 3,877,759, Cl. 303-21.00F.

Selby, John Harold; and James, George Stephen. Copper extraction. 3,878,071, Cl. 204-92.000.

Seliger, Walter, to VEB Pentacon Dresden Kamera-und Kinowerke. Charging apparatus for electro-photographic copying device. 3,877,803, Cl. 355-3.00R.

Sema, Katsutoshi: *See—*
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Senga, Akihisa; and Hidaka, Yoshiaki, to Honda Giken Kogyo Kabushiki Kaisha. Intake system for an internal combustion engine. 3,877,444, Cl. 123-75.00B.

Sentinel Distributors, inc.: *See—*
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Sexton, Arthur R.; and Corson, Frederick P., to Dow Chemical Company, The. Process for making tert.-butyl glycidyl ether. 3,878,227, Cl. 260-348.600.

Sexton, Peter, to Texas Instruments Incorporated. Copper-clad aluminum wire and method of making. 3,877,885, Cl. 29-197.000.

Seybold, Rolf, to Egon Evertz. Sliding plug for a molten metal container. 3,877,621, Cl. 222-559.000.

Seymour Foods, Inc.: *See—*
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Shaffer, William E., to Stromberg-Carlson Corporation. Ring trip circuit employing a filter network and a solid state device exhibiting electrical isolation. 3,878,340, Cl. 179-18.0HB.

Shanahan, Thomas W., to Motorola, Inc. Method of making universal wafer carrier. 3,877,134, Cl. 29-417.000.

Shaner, Kenneth H., to GTE Sylvania Incorporated. Apparatus and method for coating metallic strips. 3,877,418, Cl. 118-642.000.

Shapiro, Paul: *See*—
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Sharp, Denis: *See*—
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Sharp, Frederick L.; and Cecco, Valentino S., to Canada, Atomic Energy of, Limited. Valve assembly. 3,877,481, Cl. 137-340.000.
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Shaw, Alan Douglas, to Fanner Manufacturing Company Pty. Limited, The. Vibration technique for rot detection in wood poles and trees. 3,877,294, Cl. 73-67.200.
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Shaw Pipe Industries Ltd.: *See*—
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Shellhause, Ronald L., to General Motors Corporation. Master cylinder assembly and reservoir for same. 3,877,228, Cl. 60-585.000.
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Sheppard, Ronald J., to du Pont de Nemours, E. I., and Company. Acrylic coating composition for refinishing flexible substrates. 3,878,140, Cl. 260-17.00R.
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Shields, Walter A. Apparatus to transfer and invert a syringe barrel from one conveyor to another conveyor. 3,877,569, Cl. 198-243.000.
Shim, Kyung S., to Stauffer Chemical Company. Process for preparing mixed polyalkylene glycol phosphorus compounds. 3,878,270, Cl. 260-969.000.
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Shimizu, Otoomi; and Koyano, Hitoshi, to Oki Electric Industry Co., Ltd. Simplex ARQ system. 3,878,333, Cl. 178-23.00A.
Shimizu, Ryo: *See*—
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Shimodaira, Tadayoshi; and Gomi, Yoshifumi, to Kabushiki Kaisha Suwa Seikosha. Paper guide for a compact flying printer. 3,877,560, Cl. 197-133.00R.
Shimoura, Yoshiyuki: *See*—
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Shinozaki, Fumiaki; Tsuboi, Masayoshi; and Ikeda, Tomoaki, to Fuji Photo Film Co., Ltd. Etch-bleaching method. 3,877,938, Cl. 96-29.00L.
Shiraishi, Satoshi; Fujiwara, Kunio; and Kurosaki, Shiro, to Sumitomo Electric Industries, Ltd. Method of producing an optical transmission line. 3,877,912, Cl. 65-3.000.
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Sholes, Frederick Gordon, Jr.; and Lovell, Gary Eugene, to Martin Marietta Corporation. Computer operated solenoid valve pressure control system. 3,878,376, Cl. 235-151.340.
Shorr, Norman, to PPG Industries, Inc. Traction Rolls for Use in Glass Making. 3,877,919, Cl. 65-194.000.
Shrader, Robert L., to Airco, Inc. Lubrication system for vertical spindle motor. 3,877,546, Cl. 184-6.180.
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Leonidov, Nikolai Konstaninovich; Levin, Lev Yakovlevich; Ipatov, Petr Platonovich; Krasavtsev, Nikolai Ivanovich; Shtepa, Evgeny Dmitrievich; Gerasimenko, Jury Markovich; Degtyarev, Valery Stepanovich; Rybtsov, Alexandr Fedorovich; Tankin, Anatoly Dmitrievich; Sukhorukov, Alexandr Efimovich; Kovylin, Mikhail Mikhailovich; Markovsky, Jury Lvovich; Ryazanov, Evgeny Makarovich; Altukhov, Vyacheslav Alexeevich; Kononov, Valentin Alexeevich; and Yasakov, Evgeny Ivanovich, 3,877,686.
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Silver, Francis M., to Fraze, Ermal C. Easy opening container wall with retained tear strip. 3,877,606, Cl. 220-269.000.
Silver, Stanley M., to Paxall, Inc. Method and blank for forming a package within a wrapping. 3,877,630, Cl. 229-14.0BL.
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Sindelar, Emmett F., to Warner & Swasey Company, The. Improved feed rate generator for machine tool control. 3,878,372, Cl. 235-151.110.
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Siptrott, Fred M. High and low pressure hydro turbine. 3,877,835, Cl. 415-143.000.
Sircar, Jagadish C.; Zinnes, Harold; and Shavel, John, Jr., to Warner-Lambert Company. β-Ketoacyl derivatives of 6-aminopenicillanic acid and process thereof. 3,878,198, Cl. 260-239.100.
Sirles, Carl Wayne; and Battershall, Barry W., to Texas Instruments Incorporated. Interdigitated mesa beam lead diode and series array thereof. 3,878,553, Cl. 357-56.000.

Sirrenberg, Wilhelm; Homeyer, Bernhard; Hammann, Ingeborg; and Scheinpflug, Hans, to Bayer Aktiengesellschaft. O-(1-Halophenyl-2-chloro)-vinyl-phosphoric acid diester-amides. 3,878,269, Cl. 260-957.000.

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Smith, James Warren, to Bell Telephone Laboratories, Incorporated. Addressable switch with variable interval blinding. 3,878,510, Cl. 340-147.00R.

Smith, Oliver W.: *See—*
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Smith, Robert F. Machine key. 3,877,828, Cl. 403-358.000.

Smith, Roderick William; McEwen, Robert George; and Fraser, Douglas Leslie. Method and apparatus for removing rubber coating from airport runways. 3,877,643, Cl. 239-102.000.

Smith, Roger S., to Newbury Industries, Inc. Safety mechanism. 3,877,858, Cl. 425-152.000.

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Sobel, Sydney Murray, to Anko Metal Products Limited. Boltless display stand. 3,877,395, Cl. 108-111.000.

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Societe d'Exploitation des Brevets Neiman: *See—*
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Societe Nationale des Poudres et Explosifs: *See—*
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Solartron Electronic Group Limited, The: *See—*
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Solem, Edward L. Rotary engine. 3,877,848, Cl. 418-61.00A.

Sommerfield, Ronald. Conveyor drive system. 3,877,567, Cl. 198-189.000.

Somogyi, Francis Paul. Continuous filtration plant. 3,878,096, Cl. 210-110.000.

Sonesson Plast AB: *See—*
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Sorrells, Frank D.; and Lee, Charles A. System for the manufacture of foamed reproductions of articles. 3,878,279, Cl. 264-54.000.

Souffie, Robert David, to du Pont de Nemours, E. I., and Company. Process and apparatus arrangement for high speed injection molding and curing of large, thick cross-section objects of elastomeric material. 3,878,285, Cl. 264-329.000.

Souillard, George Jules; and Van Guaethoven, Frederic Francois, to Labofina S.A. Lubricating compositions for marine diesel engines. 3,878,115, Cl. 252-33.400.

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Southwestern Industries, Inc.: *See—*
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Spangler, Paul Joseph, to International Telephone and Telegraph Corporation. Fuse link assembly suitable for use in automotive electrical system. 3,878,497, Cl. 337-295.000.

Spassky, Jury Andreevich: *See—*
Alexeev, Semen Mikhailovich; Arkhangelsky, Mark Nikolaevich; Baldin, Valentin Pavlovich; Braverman, Boris Solomonovich; Vasiliev, Jury Dmitrievich; Gorjushev, Vladimir Petrovich; Zelvinsky, Alexandr Lvovich; Rogachev, Jury Petrovich; Severin, Gai Ilich; Spassky, Jury Andreevich; Spolitak, Boris Vasilievich; Ushinin, Vladimir Vladimirovich; and Utyamushev, Rustam Ismailovich, 3,877,427.

Spaulding, David Adams: *See—*
Falconer, David Duncan; Mueller, Kurt Hugo; Salz, Jack; and Spaulding, David Adams, 3,878,468.

Speck-Pumpen Daniel Speck & Sohne: *See—*
Speck, Walter; and Schmidt, Oskar, 3,877,834.

Speck, Walter; and Schmidt, Oskar, to Speck-Pumpen Daniel Speck & Sohne. Self-priming centrifugal pumps. 3,877,834, Cl. 415-53.000.

Speedrack Inc.: *See—*
Weider, John J., 3,877,579.

Spencer, Claude F.; and Snyder, Harry R., Jr., to Morton-Norwich Products, Inc. 9-(Substituted amino)imidazo[4,5-f]quinolines. 3,878,206, Cl. 260-247.5EP.

Sperberg, Lawrence R. Pneumatic tire inflating agents. 3,877,496, Cl. 141-4.000.

Spicer, Larry Dean; and Hand, John James, to American Cyanamid Company. Methods of preparing substituted imidazothiazolium compounds. 3,878,222, Cl. 260-306.80F.

Spivey, Joseph Wesley; Peters, David W.; and Nemechik, Joseph F., to Mercy-Lift, Inc. Invalid lift apparatus. 3,877,089, Cl. 5-81.00R.

Spolitak, Boris Vasilievich: *See—*
Alexeev, Semen Mikhailovich; Arkhangelsky, Mark Nikolaevich; Baldin, Valentin Pavlovich; Braverman, Boris Solomonovich; Vasiliev, Jury Dmitrievich; Gorjushev, Vladimir Petrovich; Zelvinsky, Alexandr Lvovich; Rogachev, Jury Petrovich; Severin, Gai Ilich; Spassky, Jury Andreevich; Spolitak, Boris Vasilievich; Ushinin, Vladimir Vladimirovich; and Utyamushev, Rustam Ismailovich, 3,877,427.

Sprague Electric Company: *See—*
Moorhead, William L.; and Kahn, Manfred, 3,878,501.

Sprague, Robert A.; and O'Brien, John A., to Itek Corporation. Method and apparatus for testing lenses. 3,877,788, Cl. 356-124.000.

Sprague, Robert H.: *See—*
Keller, Juergen H. H.; and Sprague, Robert H., 3,877,937.

Spurgeon, Samuel J., Jr.: *See—*
Merrell, Jimmy D.; Spurgeon, Samuel J., Jr.; and Dunaway, J. C., 3,877,486.

Square D Company: *See—*
Rothweiler, Richard C., 3,878,489.

Stal-Refrigeration AB: *See—*
Lundberg, Anders, 3,877,846.

Stanadyne, Inc.: *See—*
Barnes, William I., 3,877,445.

Standard Forge and Axle Company Incorporated: *See—*
Bradshaw, Harry; McKenney, Hunter R.; and McKenzie, Roland W., 3,877,141.

Standard Oil Company: *See—*
Cerefice, Steven A.; and Fields, Ellis K., 3,878,155.

Stanford Research Institute: *See—*
Wright, Maynard L.; Lehmann, Matt; and Cumming, Raymond C., 3,878,520.

Stanley, James M.: *See—*
Ohms, Edward J.; Stanley, James M.; and Schexnayder, Lawrence F., 3,877,537.

Stanley Works, The: *See—*
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Star Seimitsu Kabushiki Kaisha (Star Mfg. Co., Ltd.): *See—*
Harakawa, Mototaka, 3,878,414.

Stauffer Chemical Company: *See—*
Martin, Eugene Ray, 3,878,263.
Shim, Kyung S., 3,878,270.

Stav Praha, vyrobni stavebni druzstno stredisko Monta: *See—*
Mach, Jan; Rybar, Vaclav; and Drapal, Radovan, 3,877,441.

Stearns, Gabriel E.: *See—*
Curran, Robert W.; Dahlin, William F.; and Stearns, Gabriel E., 3,877,663.

Steckel, Elmer A.; Schaffer, William G.; and Payne, Roger A., to Gates Rubber Company, The. Continuously wrapped hose making device. 3,878,024, Cl. 156-428.000.

Steckler, Robert, to Plastik Devices, Inc. Highly absorbent spongy polymer materials. 3,878,175, Cl. 260-78.5BB.

Steel City Crane Rentals, Inc.: *See—*
Wallace, David B., 3,877,390.

Steel, Thomas C., to Federal Paper Board Company, Inc. Scoop type container. 3,877,632, Cl. 229-41.00B.

Steer, David Charles: *See—*
Kanani, Diamond Pirbhai; Sherrington, Peter John; and Steer, David Charles, 3,878,093.

Steffen, Klaus-Dieter, to Dynamit Nobel AG. Process for the manufacture of 1,4-diaminophthaiazine. 3,878,211, Cl. 260-250.00P.

Steiger, Douglas W. Power assist device for hydrostatic drive. 3,877,538, Cl. 180-6.480.

Steinberg, David Herbert: *See—*
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Steinkuhl, Bernd: *See—*
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Stephan, Frank H.; and Elmiger, Robert A., to Westinghouse Electric Corporation. Standard conductivity cell for measurement of sea water salinity and temperature. 3,878,456, Cl. 324-30.00B.

Stephan, Rudolf: *See—*
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Stephenne, Hubert; Deschenes, Pierre A.; and Busigny, Francoise, to Universite de Sherbrooke. Instantaneous adaptative delta modulation system. 3,878,465, Cl. 325-38.00B.

Sterling-Bruce, Incorporated: *See—*
Johnston, Ervin R., 3,878,015.

Sterling Drug Inc.: *See—*
Diana, Guy D.; and Hinshaw, William B., Jr., 3,878,200.

Stern, Gerhard: *See—*
Mayr, Hubert; Presoly, Elfriede; Weinrotter, Ferdinand; Muller, Walter; Stern, Gerhard; and Frohner, Walter Mizzi, deceased, 3,877,923.

Stetka, Daniel George: *See—*
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Stevens, Albert: *See—*
Frasier, Jordan D.; and Stevens, Albert, 3,878,095.

Stevens, Milton J. Fish lure. 3,877,168, Cl. 43-42.310.

Stevens, Silvester William, to Precision Valve Corporation. Pump with unitary valve member. 3,877,616, Cl. 222-321.000.

Stevens, Silvester William, to Precision Valve Corporation. Pump with slide valve. 3,877,617, Cl. 222-321.000.

Stinger, Henry Joseph, to du Pont de Nemours, E. I., and Company. Electric heater having laminated structure. 3,878,362, Cl. 219-528.000.

Stobbe, Richard E.: *See—*
Kirkham, Edward E.; Zankl, Frank; Stobbe, Richard E.; and Schachte, John J., 3,878,445.

Stocker, Harold L.: *See—*
Lefebvre, Arthur H.; Stocker, Harold L.; Reider, Samuel B.; and Tomlinson, Jerry G., 3,877,221.

Stockman, Richard F., to Air Preheater Company, Inc., The. Incinerator loader. 3,877,589, Cl. 214-23.000.

Stoddard, Darrell D.: *See—*
Levin, Berton P.; and Stoddard, Darrell D., 3,878,361.

Stoffel, Robert W.: *See—*
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Stolyar, Petr Samuilovich: *See—*
Irzhavsky, Alexandr Lvovich; Stolyar, Petr Samuilovich; and Shulgin, Konstantin Alexandrovich, 3,878,487.

Stone, Eric: *See—*
Illingworth, Edward Albert Ernest; and Stone, Eric, 3,877,333.

Storace, Anthony; and Zucker, Fredric E., to Pitney-Bowes, Inc. Automatic continuous mail handling system. 3,877,531, Cl. 177-1.000.

Storace, Anthony; and Sette, Paul R., to Pitney-Bowes, Inc. Envelope flap sealing mechanism. 3,878,025, Cl. 156-441.500.

Storer, John E., Jr., to General Motors Corporation. Transmission having hydraulic preload motor for axially positioning brake components. 3,877,321, Cl. 74-768.000.

Stotz & Co.: *See—*
Brandl, Willi; Koula, Zdenek; and Nirk, Peter, 3,877,511.

Straub, Immanuel. Pipe coupling. 3,877,733, Cl. 285-105.000.

Strickler, Tom Gilmore, III; and Hays, William Allen, Jr. Door handle assembly. 3,877,263, Cl. 70-149.000.

Stripling, William W., to United States of America, Army. Dynamic gas-liquid gyroscope bearing. 3,877,317, Cl. 74-5.60A.

Strizhenko, Vitaly Evgenievich: *See—*
Saveliev, Anatoly Semenovich; Kononenko, Vadim Grigorievich; Raizman, David Alexandrovich; Boguslavsky, Vitaly Alexandrovich; Yatsenko, Sergei Vasilievich; and Strizhenko, Vitaly Evgenievich, 3,877,331.

Strobel, Albert Frederick, to GAF Corporation. Sun-screening compounds III. 3,878,229, Cl. 260-404.500.

Stromberg-Carlson Corporation: *See—*
Shaffer, William E., 3,878,340.

Struben, Francis L., to Silver-Top Manufacturing Company, Inc. Horizontal panel skirting for below dwelling. 3,877,188, Cl. 52-169.000.

Stultz, Richard A.: *See—*
Daghe, Joseph L.; and Stultz, Richard A., 3,877,677.

Suchowski, Bernard, to Hartz Mountain Corporation, The. Method of making miter frame corner construction. 3,877,138, Cl. 29-468.000.

Suganuma, Tadao, to Nihon Denshi Kabushiki Kaisha. Electron beam generating source. 3,878,424, Cl. 313-337.000.

Sugawara, Kinichi; Shimizu, Ryo; and Kawato, Masahiko, to Nippon Steel Corporation. Method for sieving a sample of particulate materials from a sintering charge. 3,877,311, Cl. 73-432.0PS.

Sugimura, Yuriko: *See—*
Yamazaki, Shumpei; and Sugimura, Yuriko, 3,878,549.

Sukhorukov, Alexandr Efimovich: *See—*
Leonidov, Nikolai Konstaninovich; Levin, Lev Yakovlevich; Ipatov, Petr Platonovich; Krasavtsev, Nikolai Ivanovich; Shtepa, Evgeny Dmitrievich; Gerasimenko, Jury Markovich; Degtyarev, Valery Stepanovich; Rybtsov, Alexandr Fedorovich; Tankin, Anatoly Dmitrievich; Sukhorukov, Alexandr Efimovich; Kovylin, Mikhail Mikhailovich; Markovsky, Jury Lvovich; Ryazanov, Evgeny Makarovich; Altukhov, Vyacheslav Alexeevich; Kononov, Valentin Alexeevich; and Yasakov, Evgeny Ivanovich, 3,877,686.

Sullivan, David Lee: *See—*
Rapoport, Morris; and Sullivan, David Lee, 3,878,258.

Sullivan, Herbert W., to Skiatron Electronics & Television Corporation. Interrogated system. 3,878,322, Cl. 178-5.100.

Sullivan, Thomas Milton. End wrench and socket with reducing inserts. 3,877,328, Cl. 81-185.000.

Sumitomo Chemical Co., Ltd.: *See—*
Yanagida, Kiyomi; Hirokane, Tadashi; Tsukiyasu, Tadashi; and Sato, Tomoari, 3,878,056.

Sumitomo Electric Industries, Ltd.: *See—*
Shiraishi, Satoshi; Fujiwara, Kunio; and Kurosaki, Shiro, 3,877,912.

Sumitomo Naugatuck Co., Ltd.: *See—*
Shimamura, Takeshi; Yamagoshi, Tanoshi; Terakawa, Minoru; and Nishikubo, Yoshiaki, 3,878,265.

Sumitomo Shipbuilding & Machinery Co., Ltd.: *See—*
Nomura, Tsutomu; and Sakai, Masakazu, 3,877,898.

Sumitomo, Yuji: *See—*
Kasubuchi, Takeshi; Sumitomo, Yuji; and Aiba, Masahiko, 3,878,517.

Summers, James J.; and Austin, Harry W., to Mine Safety Appliances Company. Safety hat energy absorbing liner. 3,877,076, Cl. 2-3.00R.

Sunbeam Corporation: *See—*
Augustine, Robert J.; Du Bois, Jean P.; and Vicceli, Joseph L., 3,878,360.

Sunbeam Plastics Corporation: *See—*
Montgomery, Gary V.; and Julian, Randall K., 3,877,597.

Sundstrand Data Control, Inc.: *See—*
Twiss, Frank, 3,878,535.

Suzaki, Kuniyoshi, to Canon Kabushiki Kaisha. Reel supporting device in instruments loaded with reels. 3,877,656, Cl. 242-68.300.

Suzuki, Masaru, to Kabushiki-Kaisha Tokai Rika Denki Seisakusho. Combined turn signal and hazard warning signaling system for a vehicle. 3,878,508, Cl. 340-81.00R.

Suzuki, Shigeru; and Kobayashi, Yuichi, to Ricoh Co., Ltd. Device for indicating the size of copy sheets and the coverage of copying. 3,877,809, Cl. 355-133.000.

Svechnikov, Sergei Vasilievich; and Smovzh, Anatoly Kuzmich. Photoresistive-position-sensitive instrument. 3,878,500, Cl. 338-15.000.

Swanson, Ronald V.: *See—*
Reiter, Gordon S.; Rubin, Charles P.; Swanson, Ronald V.; Burns, Bernard F., Jr.; and Iorillo, Anthony J., 3,877,316.
Reiter, Gordon S.; Rubin, Charles P.; Swanson, Ronald V.; Burns, Bernard F., Jr.; and Iorillo, Anthony J., 3,877,662.

Sweny, John W.; and Burkhard, Frank C., Jr., to Allied Chemical Corporation. Absorption and separation of normally liquid gas contaminants. 3,877,893, Cl. 55-48.000.

SWF-Speczial fabrikfur Autozubehor Gustav Rau GmbH: *See—*
Bauer, Kurt; Dorr, Wilhelm; Kohler, Alfred; Weber, Martin; and Schmid, Eckhardt, 3,877,106.

Swoager, Jon R., to Automation Equipment, Inc. Multi-purpose vehicle for use underground. 3,877,717, Cl. 280-96.20R.

Swope, Lawrence G.; and Smith, Emory A., to United States of America, Atomic Energy Commission. Gas chromatograph column material. 3,877,894, Cl. 55-67.000.

Sylvan, Tage Peter, to Teradyne, Inc. Switching circuitry for logical testing of network connections. 3,878,405, Cl. 307-247.00R.

Sylvester, James L., to Gardner Machines. Sawmill feedwork systems and improvements therein. 3,877,225, Cl. 60-403.000.

Sylvester, John L.: *See—*
Forchini, James F.; and Sylvester, John L., 3,877,676.

Syntex (U.S.A) Inc.: *See—*
Moffatt, John G.; and Jones, Gordon H., 3,878,194.

Syva Company: *See—*
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Syvakari, Pertti. High pressure seal. 3,877,707, Cl. 277-190.000.

Sze, Morgan C.: *See—*
Long, Raymond H.; and Sze, Morgan C., 3,878,051.

Szeverenyi, Nikolaus A.; and Thompson, David F., to GTE Sylvania Incorporated. Position sensor with thermal time delay. 3,878,538, Cl. 340-282.000.

Taillie, Steven A.; and Weber, Frank E., to R. T. French Company. Method for the manufacture of mustard mucilage. 3,878,195, Cl. 260-212.000.

Taiseki Kunugi: *See—*
Kunugi, Taiseki; Fujimoto, Kaoru; and Takashima, Hiroaki, 3,878,260.

Tajima, Tatsuya: *See—*
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Tsuji, Nobuo; Tajima, Tatsuya; and Tsuchiya, Yoshinori, 3,877,947.

Takagi, Yutaka, to Sharp Kabushiki Kaisha. Microwave cooking apparatus. 3,878,350, Cl. 219-10.55E.

Takahashi, Kentaro: *See—*
Sasame, Takao; and Takahashi, Kentaro, 3,877,854.

Takahashi, Koichi; Hitomi, Nobuteru; Yanai, Tokiyoshi; and Tsunematsu, Manabu, to Nissan Motor Company, Limited. Vane pump housing. 3,877,127, Cl. 29-156.4WL.

Takahashi, Mitsura; Narushima, Uraji; and Omori, Yukio, to Nippon Paint Co., Ltd. Acrylate and styrene graft copolymers of mercaptogroup-containing cellulose derivatives and coating composition containing same. 3,878,139, Cl. 260-17.00A.

Takahashi, Ryoichi: *See—*
Kawai, Yoshio; Araki, Tadashi; Watanabe, Kazuhiro; Takahashi, Ryoichi; Noguchi, Kazuo; Hatazawa, Nobuo; and Hatazawa, Nobuo, 3,878,087.

Takashima, Hiroaki: *See—*
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Takata, Toshiyasu, to NTN Toyo Bearing Company Ltd.; and Tsukumo, Zenzaburo. Bobbin hanger. 3,877,659, Cl. 242-130.200.

Takeda Chemical Industries, Ltd.: *See—*
Ochiai, Michihiko; Aki, Osami; Morimoto, Akira; Okada, Taiiti; and Masuda, Katsutada, 3,878,204.
Tatsumi, Tetsujiro; Miyamoto, Reiji; Matsui, Yutaka; Kazama, Seiji; Takemura, Tadao; and Kanayama, Hikoyoshi, 3,877,969.

Takemura, Tadao: *See—*
Tatsumi, Tetsujiro; Miyamoto, Reiji; Matsui, Yutaka; Kazama, Seiji; Takemura, Tadao; and Kanayama, Hikoyoshi, 3,877,969.

Takeuchi, Yasuhisa; and Yanagishima, Takayuki, to Nissan Motor Company, Limited. Electronic safety assurance system for an automotive vehicle. 3,877,541, Cl. 180-99.000.

Takeuchi, Yasuhisa: *See—*
Sekiguchi, Tomoyoshi; and Takeuchi, Yasuhisa, 3,877,759.

Talley Industries, Inc.: *See—*
Lette, Lee; and Andre, Paul, 3,877,882.

Tanabe, Hiroyuki: *See—*
Tsubouchi, Yoshio; Shima, Noboru; and Tanabe, Hiroyuki, 3,877,490.

Tanaka, Kazuaki; Ishida, Yasuto; Sato, Mamoru; Kishimoto, Hidetaka; and Yanagi, Kimiyoshi, to Kyowa Yuka Kabushiki Kaisha. Recovery of alkylvinylether by extractive distillation of a feed containing only trace amounts of water. 3,878,058, Cl. 203-63.000.

Tanaka, Kenichi: *See—*
Fukawa, Hideaki; and Tanaka, Kenichi, 3,878,202.

Tanaka, Nobuo: *See—*
Kurihara, Takao; Tanaka, Nobuo; Yamagishi, Toru; Nakaoka, Kazuhide; Araki, Kenzi; Iwase, Kozi; and Kubotera, Haruo, 3,877,684.

Tanaka, Tadashi; Obi, Tatsuro; and Shindow, Yoshio, to Nippon Steel Corporation. Apparatus and process for applying electrodeposition painting by alternating current. 3,878,078, Cl. 204-181.000.

Tangorra, Giorgio; and Bertelli, Italo, to Industrie Pirelli, S.p.A. Method for anchoring a pneumatic tire to the rim and pneumatic wheel so obtained. 3,877,503, Cl. 152-379.000.

Taniguchi, Tadasu, to Canon Kabushiki Kaisha; and Canon Denshi Kabushiki Kaisha. Device for machining spherical surfaces. 3,877,177, Cl. 51-131.000.

Taniguchi, Yasuyuki: *See—*
Watanabe, Shozo; Kitayama, Minoru; Yamadera, Shigenori; Taniguchi, Yasuyuki; and Yamaguchi, Susumu, 3,877,977.

Tank, Eggert; and Pigisch, Franz, to Daimler-Benz Aktiengesellschaft. Method for increasing the adhesive strength of layers applied by thermal spraying. 3,877,961, Cl. 427-191.000.

Tankin, Anatoly Dmitrievich: *See—*
Leonidov, Nikolai Konstaninovich; Levin, Lev Yakovlevich; Ipatov, Petr Platonovich; Krasavtsev, Nikolai Ivanovich; Shtepa, Evgeny Dmitrievich; Gerasimenko, Jury Markovich; Degtyarev, Valery Stepanovich; Rybtsov, Alexandr Fedorovich; Tankin, Anatoly Dmitrievich; Sukhorukov, Alexandr Efimovich; Kovylin, Mikhail Mikhailovich; Markovsky, Jury Lvovich; Ryazanov, Evgeny Makarovich; Altukhov, Vyacheslav Alexeevich; Kononov, Valentin Alexeevich; and Yasakov, Evgeny Ivanovich, 3,877,686.

Tannahill, Alex L.; and Finn, Robert K., to Cornell Research Foundation, Inc. Process for the production of heteropolysaccharide by fermentation of methanol. 3,878,045, Cl. 195-49.000.

Tannenbaum, Steven R.; Weaver, James C.; and Cooney, Charles L., to Massachusetts Institute of Technology. Biochemical temperature-sensitive probe and method for measuring reactant concentrations thereof. 3,878,049, Cl. 195-103.50R.

Tanouchi, Tadao: *See—*
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Tapeler Corporation: *See—*
Davis, Robert F., 3,878,022.

Tatsumi, Tetsujiro; Miyamoto, Reiji; Matsui, Yutaka; Kazama, Seiji; Takemura, Tadao; and Kanayama, Hikoyoshi, to Takeda Chemical Industries, Ltd.; and Mitsui Polychemicals, Co., Ltd. Coated glass bottles. 3,877,969, Cl. 428-216.000.

Tawarada, Takeshi; Okaniwa, Shigeru; and Nagahashi, Katsuo, to Nippon Light Metal Research Laboratory Ltd.; and Toyo Kogyo Co., Ltd. Dispersion strengthened aluminum bearing material. 3,877,884, Cl. 29-182.500.

Taylor, Allen L., to Minnesota Mining and Manufacturing Company. Pyroelectric temperature compensated sensing apparatus. 3,877,308, Cl. 73-362.0CP.

Taylor, Kendall D., to General Motors Corporation. Heated remotely controlled outside rearview mirror. 3,877,780, Cl. 350-63.000.

Taylor, Lynn J.; and Grier, John D., to Owens-Illinois, Inc. Substrate coating composition and process. 3,877,962, Cl. 427-375.000.

Ted Bildplatten Aktiengesellschaft: *See—*
Joschko, Gunter; Schriefl, Karl-Ekkehard; and Winter, Hans-Jurgen, 3,877,705.

Teege, Gernot: *See—*
Fischer, Roman; Teege, Gernot; Fliege, Werner; and Koernig, Wolfgang, 3,878,149.

Tegtmeier, Richard J.; Helms, Jimmy L.; and Backhaus, Karl L., to Concast Incorporated. Apparatus for cooling a continuously cast strand incorporating coolant spray nozzles providing controlled spray pattern. 3,877,510, Cl. 164-283.500.

Tennessee Valley Authority: *See—*
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Tepper, Karen. Versatile two-piece body garment. 3,877,078, Cl. 2-74.000.

Teradyne, Inc.: *See—*
Sylvan, Tage Peter, 3,878,405.

Terakawa, Minoru: *See—*
Shimamura, Takeshi; Yamagoshi, Tanoshi; Terakawa, Minoru; and Nishikubo, Yoshiaki, 3,878,265.

Terhune, Ralph D.: *See—*
Conley, James D.; Belden, Donald E.; and Terhune, Ralph D., 3,878,094.

Terwilliger, Raymond G. Time and distance rally computer. 3,878,363, Cl. 235-61.00V.

Tesco Engineering Company: *See—*
Miller, Shelond M., 3,878,444.

Texaco Exploration Canada Ltd.: *See—*
Redford, David Arthur, 3,878,090.

Texaco Inc.: *See—*
Altamira, Anthony F.; and Hoyt, Donald L., 3,877,521.
Holder, Charles B.; Lachowicz, Donald R.; Rubin, Isaac D.; and Saines, George S., 3,878,180.
Moore, Fred W.; and Vermillion, Herbert E., 3,877,887.
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Texas Instruments Incorporated: *See—*
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Callahan, Michael J., Jr., 3,878,551.
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Sirles, Carl Wayne; and Battershall, Barry W., 3,878,553.

Textron Inc.: *See—*
Evans, Thomas J.; Walker, William; and Hall, Edward E., deceased, 3,877,601.
Louw, Johan A.; and Ghiselin, Robert E., 3,877,629.
St. Clair, Theodore A., 3,877,305.

Thastrup, Ove, to A/S E. Ramussen. Insulated pipe systems. 3,877,491, Cl. 138-149.000.

Thausing, Heinrich E.: *See—*
Green, John C.; Thausing, Heinrich E.; and May, Edward T., 3,877,845.

Thayer, Earl C.; and Buelow, William H., to Rexnord Inc. Auxiliary axle control system. 3,877,715, Cl. 280-81.00A.

Theodore, David T.: *See—*
Clark, Fitzhugh T.; and Theodore, David T., 3,877,378.

Theriot, Gerold F.; and Hoofnagle, Frank M., to B. W. B. Controls, Inc. Pneumatic relay. 3,877,484, Cl. 137-625.660.

Theurer, Josef: *See—*
Plasser, Franz; and Theurer, Josef, 3,877,160.

Thiokol Chemical Corporation: *See—*
McCullough, Edward E.; Bambrick, Robert W.; and Laramee, Richard C., 3,877,646.

Thomas & Betts Corporation: *See—*
Eppler, Daniel, 3,877,277.
Eppler, Daniel, 3,877,278.

Thomas, Michael W., to Westinghouse Electric Corporation. Magnetic core for electrical inductive apparatus. 3,878,495, Cl. 336-212.000.

Thomas, Willis G., Jr.: *See—*
Field, Nathan D.; Smolin, Edwin M.; Thomas, Willis G., Jr.; and Williams, Earl P., 3,878,310.

Thompson, Basil C.: *See—*
Gurak, Richard J.; Thompson, Basil C.; Rabow, Gerald; Filo, John P.; and Seipel, Arnold J., 3,878,522.

Thompson, David F.: *See—*
Szeverenyi, Nikolaus A.; and Thompson, David F., 3,878,538.

Thompson, Duane T., to Wilks Scientific Corporation. Multiple wavelength spectrometer. 3,877,812, Cl. 356-97.000.

Thompson, Howard E.; and Noonan, Frank M., to United States of America, Army. Method for detection and droplet measurement of S-(2-diisopropylaminoethyl)O-ethyl methylphosphonothioate chemical warfare agent with 1,3,5 trinitrobenzene. 3,877,874, Cl. 23-230.00M.

Thomson-CSF: *See—*
D'Auria, Luigi, 3,878,515.
Hartemann, Pierre; and Genauzeau, Francel, 3,878,407.
Roncillat, Michel; and Hareng, Michel, 3,878,537.

Thornton, George E.; and Newby, Danvis T., to United States of America, National Aeronautics and Space Administration. Hole cutter. 3,877,833, Cl. 408-186.000.

Thornton, William A., Jr., to Westinghouse Electric Corporation. Optical filter combination for improving color discrimination. 3,877,797, Cl. 351-44.000.

Tibbetts, Alan R.; and Tucker, Donald R., to Airco, Inc. Method of producing a finned tube heat exchanger. 3,877,128, Cl. 29-157.30A.

Tidd Chemisch-technische Produkte G.m.b.H., Firma: *See—*
Tisza, Julianna, 3,878,142.

Tiedeman, George T., to Weyerhaeuser Company. Rapid curing resin compositions comprising a ketone-aldehyde condensation polymer modified with an acyl hydrazide. 3,878,021, Cl. 156-331.000.

Tilkens, Lucien, to Yamaha Hatsudoki Kabushiki Kaisha. Motorcycle shock absorbing rear fork suspension. 3,877,539, Cl. 180-32.000.

Timmons, Richard J.; and Gallant, William E., to O. M. Scott and Sons Company, The. Herbicidal Phenoxyalkyloxazolines. 3,877,921, Cl. 71-76.000.

Tinker, Walter H. Steam engine system and process of operating the same. 3,877,231, Cl. 60-654.000.

Tirrell, John E., Jr.: *See—*
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Tisza, Julianna, to Tidd Chemisch-technische Produkte G.m.b.H., Firma. Compositions for lining casting moulds and related articles and method of making such articles. 3,878,142, Cl. 260-17.200.

Titus, Charles H.: *See—*
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Tjernsteom, Ove, to Allmanna Svenska Elektriska Aktiebolaget. Liquid-cooled transformer winding. 3,878,492, Cl. 336-62.000.

Todd, Sidney Clarke, to Pierce-All Manufacturing Limited. Work clamps. 3,877,689, Cl. 269-32.000.

Todt, Hans-Gunther; and Voss, Gunter. Acid zinc galvanic bath. 3,878,069, Cl. 204-55.00R.

Tolar, Harry R.; and Gresser, Arnold P. Laminated multi-focal lenses. 3,877,798, Cl. 351-168.000.

Tollefsbol, Werner L., to SmithKline Corporation. Adjustable foot support for a leg cast. 3,877,423, Cl. 128-83.500.

Tomcufcik, Andrew Stephen, to American Cyanamid Company. 1,5-Bis substituted-1,4-pentadien-3-one substituted amidinohydrazone salts and method of preparing the same. 3,878,201, Cl. 260-240.00G.

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Tomlinson, Jerry G.: *See—*
Lefebvre, Arthur H.; Stocker, Harold L.; Reider, Samuel B.; and Tomlinson, Jerry G., 3,877,221.

Tompkins, Leo L. Horizontal windmill. 3,877,836, Cl. 416-119.000.

Topolsek, Hermann Adolf Josef. Method of manufacturing a fence of thermoplastic pickets with embedded wire connecting links. 3,877,140, Cl. 29-527.100.

Topping, Frederick V.: *See—*
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Toray Industries, Inc.: *See—*
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Toth, John S. Protective jacket for string musical instruments. 3,877,501, Cl. 150-52.00R.

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Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
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Trainor, James E.; and Haug, Thomas J., to F. C. Heiden, Inc. Liquid smoke spray cabinet. 3,877,361, Cl. 99-478.000.

Tramuta, Salvatore S.; Miller, James G.; and Knox, William M., to General Electric Company. Pressurized strongback regenerator. 3,877,519, Cl. 165-166.000.

Trans Canada Pipelines Limited: *See—*
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Transmission Development Limited: *See—*
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Trisoglio, Giovanni: *See—*
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Trolle, Sten, to AB Carbox. Machine for treating workpieces at elevated pressures, especially a high-pressure press. 3,877,285, Cl. 72-429.000.

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Gorobets, Vladimir Ivanovich; Gorobets, Larisa Zhanovna; Ivanov, Anatoly Alexandrovich; Tropin, Georgy Petrovich; Chirkov, Veniamin Ivanovich; Konstantinov, Veniamin Viktorovich; and Belyaev, Viktor Deomidovich, 3,877,647.

Troutner, Arthur L., to Trus Joist Corporation. Continuous, laminated-platen press for pressing glue-coated press charges. 3,878,027, Cl. 156-580.000.

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Tsubouchi, Yoshio; Shima, Noboru; and Tanabe, Hiroyuki, to Nippon Kokan Kabushiki Kaisha. Steel pipes provided with plastic coatings. 3,877,490, Cl. 138-141.000.

Tsuchiya, Kenji; Ito, Yoji; Matsushita, Yasuhiro; Tsuji, Hideshi; and Sasaki, Tomohisa, to Nippon Steel Corporation. Heating device set in the rolling mill. 3,877,867, Cl. 432-45.000.

Tsuchiya, Yoshinori: *See—*
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Tsuji, Nobuo; Tajima, Tatsuya; and Tsuchiya, Yoshinori, to Fuji Photo Film Co., Ltd. Photographic element. 3,877,946, Cl. 96-87.00R.

Tsuji, Nobuo; Tajima, Tatsuya; and Tsuchiya, Yoshinori. Photographic element. 3,877,947, Cl. 96-87.00R.
Tsukamoto, Akira, to British Industrial Plastics Limited. Modified-aminoplast moulding compositions. 3,878,264, Cl. 260-852.000.
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Uchida, Kozo, to Iwatsu Electric Co., Ltd. System for converting a ratio of two signals into a logarithmic value. 3,878,383, Cl. 235-183.000.
Uhler, Marcus H., to Westinghouse Electric Corporation. Television system for improving reading skills. 3,878,327, Cl. 178-7.50R.
Uhlir, Pavel, to Elitex, Zavody textilniho strojirenstvi, generalni reditelstvi. Apparatus for controlling the automatic selection of sinkers in circular knitting machines. 3,877,258, Cl. 66-93.000.
Ulmer, Jamie F. Rotary tool guard. 3,877,500, Cl. 144-251.00A.
Unarco Industries, Inc.: *See—*
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National Aeronautics and Space Administration; administrator; with respect to an invention of:
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Urry, Lewis F., to Union Carbide Corporation. Primary dry cell with fail-safe vent. 3,877,992, Cl. 136-107.000.
Urssing, Allen H.; Despain, William R.; and Ramos, Henry John, to R&D Metals. Method for reclaiming insulated wire utilizing agitation of a chlorinated hydrocarbon bath. 3,877,474, Cl. 134-6.000.

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Vail, Sidney L.; Young, Alvin H.; and Verburg, Gerald B., to United States of America, Agriculture. Process for improving abrasion resistance of resilient fabrics and the product produced. 3,877,872, Cl. 8-183.000.

Valentini, Mario. Mold for holding container shells during introduction of insulation therebetween. 3,877,856, Cl. 425-110.000.

Valint, Paul L.: *See*—
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Van Bennekom, Carl F.: *See*—
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Van Cleave, Eugene H., to Van Mark Products Corporation. Sheet metal brake. 3,877,279, Cl. 72-319.000.

Van der Werf, Herman Antonius, to N.V. Hollandse Signaalapparaten. Method for the manufacture of yarn. 3,877,214, Cl. 57-164.000.

Van De Wall, LaVerne R., to Dynalec Corporation. Shockproof telephone set. 3,878,343, Cl. 179-100.00R.

Van Gils, Gerard E., to General Tire & Rubber Company, The. Method of preparing polyamide reinforced polyester resins. 3,878,035, Cl. 260-835.000.

Van Guaethoven, Frederic Francois: *See*—
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Van Zeeland, Donald L.; and Schuchmann, Russell P., to Cutler-Hammer, Inc. Dormant oscillator ground to neutral protection for ground fault interrupters. 3,878,435, Cl. 317-18.00D.

Vargiu, Silvio; and Pezzoli, Silvestro, to Societa Italiana Resine S.I.R. S.p.A. Foundry binders on the basis of phenolic resins. 3,878,159, Cl. 260-38.000.

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Riccius, Rolf; and Sadowski, Herbert, 3,877,665.
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Vergobbi, Robert W., to Pneumatic Scale Corporation. Apparatus for applying carrier grids to bottles. 3,877,198, Cl. 53-48.000.

Vermes, Andrew R. Intra-uterine biopsy apparatus. 3,877,464, Cl. 128-2.00B.

Vermillion, Herbert E.: *See*—
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Vetsch, LeRoy E., to Eldec Corporation. Flowmeter. 3,877,304, Cl. 73-231.00M.

Vetsch, Rudolf, to Warner & Swasey Company, The. Turret indexing machine. 3,877,323, Cl. 74-826.000.

Vick, James A., to Schuyler Development Corporation. Methods of restoring cardiac rhythm. 3,878,297, Cl. 424-98.000.

Vidovic, Nikola, to International Video Corporation. Color framing videotape recording apparatus and method. 3,878,557, Cl. 358-4.000.

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Vilain, Pol Ghislain; Beziat, Daniel Bernard; Hatinguais, Philippe Maurice; and Lauressergues, Henri Pierre, to Investigations Scientifiques Pharmaceutiques. Plant extracts having peripheral coronary dilatory and vasodilatory action. 3,878,299, Cl. 424-195.000.

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Vokes, Robert F., to Black Clawson Company, The. Defibering apparatus including multiple horizontally spaced comminuting surfaces. 3,877,648, Cl. 241-45.000.

Volin, Timothy Earl, to International Nickel Company, Inc., The. Organic interdispersion cold bonding control agents for use in mechanical alloying. 3,877,930, Cl. 75-0.50R.

Volkswagenwerk Aktiengesellschaft: *See*—
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Volpe, Michael A. Baseball bat with replaceable ball-striking portion. 3,877,698, Cl. 273-72.00R.

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Vonnegut, Bernard; Chessin, Henry; and Passarelli, Richard E., Jr., to United States of America, Navy. Freezing nucleant. 3,877,642, Cl. 239-2.00R.

Von Sande, Herman L. Retainers for food containers. 3,877,668, Cl. 248-154.000.

Von Werder, Fritz: *See*—
Irmscher, Klaus; Von Werder, Fritz; Bork, Karl-Heinz; and Kraft, Hans-Guenther, 3,878,228.

Voorhoeve, Ernst W., to Leeds & Northrup Company. Power-limiting electrical barrier device. 3,878,434, Cl. 317-16.000.

Voss, Gunter: *See*—
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Vukotic, Milos: *See*—
Eriksson, Bolik Anders Gottfrid; and Vukotic, Milos, 3,877,902.

Vyzkumny ustav matematickych stroju: *See*—
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W. R. Grace and Co.: *See*—
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Wacker-Chemie GmbH: *See*—
Deckert, Helmut; and Jacob, Herbert, 3,877,183.
Nitzsche, Siegfried; Pirson, Ewald; and Roth, Michael, 3,877,956.
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Waddell, Jerry D.: *See*—
Akester, Roger L.; Dugge, Richard H.; Fossett, Wallace Lee; and Waddell, Jerry D., 3,877,392.

Wade, Charles H., to Whirlpool Corporation. Air transport system for ice maker. 3,877,241, Cl. 62-137.000.

Wadsworth, Brent Earl: *See*—
Pecsar, Raymond Ernest; and Wadsworth, Brent Earl, 3,877,310.

Wagner, Daniel: *See*—
Schneider, Richard S.; and Wagner, Daniel, 3,878,187.

Wagner, Frank Albert, Jr., to American Cyanamid Company. Oxygenated derivatives of s-(tert-butylthio)methyl o,o-diethyl phosphorodithioate and phosphorothioate. 3,878,267, Cl. 260-948.000.

Wagner, Howard S., to Mosler Safe Company, The. Vault protected wtih electronic time and combination lock. 3,878,511, Cl. 340-147.0MD.

Wahl, Ralph Edward, to General Electric Company. Corona-resistant ethylene-propylene rubber insulated power cable. 3,878,319, Cl. 174-106.0SC.

Wahlmark, Gunnar A., to Wahlmark Systems, Inc. Universal joint system. 3,877,251, Cl. 64-21.000.

Wahlmark Systems, Inc.: *See—*
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Wahlstedt, Robert L., to Reel Precision Manufacturing Corporation. Torque meter. 3,877,274, Cl. 73-136.00A.

Wahnschaffe, Jurgen: *See—*
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Wakabayashi, Takao, to Nakanishi Metal Co., Ltd. Apparatus for controlling conveyance of articles. 3,877,386, Cl. 104-172.00R.

Wakabayashi, Yoshikazy: *See—*
Ono, Kaoru; Kamada, Masashi; Ohisuru, Hiroyuki; Wakabayashi, Yoshikazy; Nakamura, Shotaro; and Yamada, Tadashi, 3,877,881.

Wakao, Mitsuru: *See—*
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Walden, Mark Philip Gray: *See—*
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Waldman, Elliot Isadore; and Aylward, John Richard, to United Aircraft Corporation. Power system and an electrochemical control device therefor. 3,877,989, Cl. 136-86.00B.

Walford, Richard L., to J. P. Stevens & Co., Inc. Method and apparatus for knitting fabric from untwisted staple fibers. 3,877,254, Cl. 66-9.00B.

Walker, David D.: *See—*
Benjamin, Milton L.; and Walker, David D., 3,877,322.

Walker, Wellington E.; Brown, Earle S.; and Pruett, Roy L., to Union Carbide Corporation. Trivalent metal salts of dodecarhodiumtriaconta carbonyls. 3,878,214, Cl. 423-263.000.

Walker, Wellington E.; Brown, Earle S.; and Pruett, Roy L., to Union Carbide Corporation. Divalent metal salts of dodecarhodiumtriaconta carbonyls. 3,878,290, Cl. 423-249.000.

Walker, Wellington E.; Brown, Earle S.; and Pruett, Roy L., to Union Carbide Corporation. Monovalent metal salts of dodeearhodiumtriaconta carbonyls. 3,878,292, Cl. 423-417.000.

Walker, William: *See—*
Evans, Thomas J.; Walker, William; and Hall, Edward E., deceased, 3,877,601.

Walker, William D.: *See—*
Campbell, Mahlon E.; and Walker, William D., 3,878,113.

Wall, Roy. Shaping tool for creating artistic designs in sand art bottles. 3,877,325, Cl. 81-3.00R.

Wallace, David B., to Steel City Crane Rentals, Inc. Convertible rail-highway vehicle apparatus. 3,877,390, Cl. 105-159.000.

Wallace, William K.: *See—*
Amtsberg, Lester A.; and Wallace, William K., 3,877,284.

Wallis, Frederick Henry: *See—*
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Wallrafen, Gunter: *See—*
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Walter Scheele KG, Firma: *See—*
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Walther, Terry R.; and McCoy, Michael R., to Electronic Arrays, Inc. Integrated circuit of the MOS variety. 3,878,404, Cl. 307-238.000.

Walther, William D.; and DeRegnaucourt, Robert A., to Dayton Steel Foundry Company, The. Dual rim and wheel assembly. 3,877,754, Cl. 301-13.0SM.

Wang, Jish-Min: *See—*
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Wankel G.m.b.H.: *See—*
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Wann, William C., Jr.: *See—*
Anderson, Gerald R.; and Wann, William C., Jr., 3,878,309.

Ward, William A. Gunsight mount with spring biased jaw. 3,877,166, Cl. 42-1.00S.

Warner-Lambert Company: *See—*
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Keegan, James J.; Patel, Girish; and Rubin, Howard, 3,878,135.
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Warren, Robert G.; and Whitcomb, Eugene C., to Rockwell International Corporation. Method of chemically polishing metallic oxides. 3,878,005, Cl. 156-2.000.

Warwick Electronics Inc.: *See—*
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Watanabe, Kazuhiro: *See—*
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Watanabe, Masaru: *See—*
Yonezawa, Teruhiko; and Watanabe, Masaru, 3,877,948.

Watanabe, Shozo; Kitayama, Minoru; Yamadera, Shigenori; Taniguchi, Yasuyuki; and Yamaguchi, Susumu. Floating rust preventing film coated steel members for buildings and structures. 3,877,977, Cl. 428-336.000.

Watson, Hugh R., to Wilkinson Sword Limited. Self-heating chemical compositions. 3,878,118, Cl. 252-90.000.

Watt, William E. R.: *See—*
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WDT: *See—*
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Weaver, James C.: *See—*
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Weaver, Max A.: *See—*
Coates, Clarence A., Jr.; and Weaver, Max A., 3,878,189.

Weaver, Max Allen; and Pridgen, Herman Speight, to Eastman Kodak Company. Thiadiazolyl-azo-α-naphthylamine compounds. 3,878,190, Cl. 260-158.000.

Weber, Frank E.: *See—*
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Weber, Martin: *See—*
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Webster, Gordon A.: *See—*
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Wechter, Margaret A.; and Hahn, Paul B., to Iowa State University Research Foundation, Inc. Method of chelometric titration of metal cations using tungsten bronze electrode. 3,878,059, Cl. 204-1.00T.

Weckeiser, Kurt A. Release ski binding for downhill and cross-country. 3,877,712, Cl. 280-11.35D.

Weider, John J., to Speedrack Inc. Adjustable connector for structural members. 3,877,579, Cl. 211-176.000.

Weinrotter, Ferdinand: *See—*
Mayr, Hubert; Presoly, Elfriede; Weinrotter, Ferdinand; Muller, Walter; Stern, Gerhard; and Frohner, Walter Mizzi, deceased, 3,877,923.

Weiskopf, Marvin: *See—*
Dellian, Kurt A.; Weiskopf, Marvin; and Lee, Samuel, 3,877,870.

Weisman, Arnold M., to William Jacobs a/k/a Calmark. Printed circuit card guide. 3,878,438, Cl. 317-101.0DH.

Weiss, Ralph A. E.; and Frey, Donald G., to Westinghouse Electric Corporation. Remote-angle-of-rotation measurement device using light modulation and electro-optical sensors. 3,877,816, Cl. 356-138.000.

Weiss, Sigmond. Method of fabricating seaming tape. 3,877,959, Cl. 427-172.000.

Weissberger, Gunther: *See—*
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Weissenfels, Franz: *See—*
Junger, Hans; Weissenfels, Franz; and Pungs, Wolfgang, 3,877,967.

Weisstuch, Aaron; and Schell, Charles E., III, to Betz Laboratories, Inc. Method and apparatus for measuring pitting corrosion tendencies. 3,878,064, Cl. 204-1.00T.

Wells, Edmund F. Abrading tool. 3,877,185, Cl. 51-358.000.

Welsh, John: *See—*
Gibbs, James Whitman, 3,878,349.

Wendel, Kurt: *See—*
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Wenzel, Dr.-Ing. Werner, Prof.: *See—*
Wenzel, Werner; Franke, Friedrich H.; Konig, Horst; and Meraikib, Mohammed, 3,877,868.

Wenzel, Werner; Franke, Friedrich H.; Konig, Horst; and Meraikib, Mohammed, to Demag Aktiengesellschaft; Rheinische Braunkohlenwerke AG; and Wenzel, Dr.-Ing. Werner, Prof. Shaft furnace for treating pelletized materials. 3,877,868, Cl. 432-98.000.

Werkzeugmaschinenfabrik Oerlikan-Buhrle AG: *See—*
Kotthaus, Erich, 3,877,176.

Werner, John R., to Burroughs Corporation. Data processing method and apparatus using occupancy indications to reserve storage space for a stack. 3,878,513, Cl. 340-172.500.

Werntz, Charles W., to Alvey Inc. Pressure free article conveyor. 3,877,565, Cl. 198-127.00R.

Werth, John J., to ESB Incorporated. Alkali metal-metal chloride battery. 3,877,984, Cl. 136-6.00F.

Wesemann, Fred A. Fruit harvester. 3,877,208, Cl. 56-328.00R.

Wesolowski, Adolph J., to Dyna Corporation. Winding for rotary electrical device and method of making. 3,878,415, Cl. 310-184.000.

West Virginia Bolt Inc.: *See—*
Hill, David H., 3,877,235.

Western Electric Company, Incorporated: *See—*
Balde, John William, 3,878,341.
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Westinghouse Electric Corporation: *See—*
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Bogel, George F., 3,878,436.
Bozanic, Donald A.; Mergerian, Dickron; and Minarik, Ronald W., 3,878,529.
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Warren, Robert G.; and Whitcomb, Eugene C., 3,878,005.

White Chemical Corporation: *See—*
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Whitehead, Jack; and Salt, Frederick George. Process for reducing iron content of titaniferous material. 3,877,929, Cl. 75-1.000.

Widtmann, Georg: *See—*
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Wieder, Horst K. Artificial insemination apparatus. 3,877,430, Cl. 128-235.000.

Wieland, Werner, to Audi NSU Auto Union Aktiengesellschaft; and Wankel G.m.b.H. Construction of rotor for rotary mechanisms. 3,877,849, Cl. 418-61.00A.

Wiener, Samuel, Jr. Convertible storage container/picture frame assembly. 3,877,572, Cl. 206-223.000.

Wild, John Paul, to Commonwealth Scientific and Industrial Research Organization. Generation of scanning radio beams. 3,878,523, Cl. 343-108.00M.

Wilfert, Karl; and Andres, Rudolf, to Daimler-Benz Aktiengesellschaft. Bumper for motor vehicles, especially passenger motor vehicles. 3,877,741, Cl. 293-89.000.

Wilh. Quester: *See—*
Quester, Karl Wilhelm, 3,877,586.

Wilhelm, Frederick C., to Universal Oil Products Company. Hydrocarbon conversion with a multimetallic catalytic composite. 3,878,089, Cl. 208-139.000.

Wilhelm, Frederick C.: *See—*
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Wilhelm, John Raymond. Water closets. 3,877,082, Cl. 4-67.00R.

Wilhelmi, Frank A.; and Ifune, Ben, to Hughes Aircraft Company. High pulse rate, high duty factor line modulator type pulse generators. 3,878,449, Cl. 321-15.000.

Wilkes, Mulkey Carl: *See—*
Cox, Jerry W.; and Wilkes, Mulkey Carl, 3,878,055.

Wilkinson Sword Limited: *See—*
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Wilks Scientific Corporation: *See—*
Thompson, Duane T., 3,877,812.

Willhite, Charles C.; and Zenk, George E., to Bell Telephone Laboratories, Incorporated. Limit circuits. 3,878,403, Cl. 307-237.000.

William Jacobs a/k/a Calmark: *See—*
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Williams, Earl P.: *See—*
Field, Nathan D.; Smolin, Edwin M.; Thomas, Willis G., Jr.; and Williams, Earl P., 3,878,310.

Williams, Lee F. Device and method for fishing rod repair. 3,878,012, Cl. 156-94.000.

Williams, Leslie. Bingo type chip dispenser. 3,877,473, Cl. 133-5.00A.

Williams, Merton S., to Emhart Corporation. Emergency exit latch and actuator assembly. 3,877,262, Cl. 70-92.000.

Williams, Ralph P.; and Louthan, Rector P., to Phillips Petroleum Company. Novel benzothiazyl disulfides, their preparation and use as lubricant additives. 3,878,117, Cl. 252-47.000.

Williams, Reade: *See—*
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Williams, Wilmore: *See—*
Luksas, Anthony J.; and Williams, Wilmore, 3,878,302.

Willuweit, Werner; and Jordan, Terence D., to F. Jos. Lamb Company. Oil mist lubricating system for machines. 3,877,547, Cl. 184-6.260.

Wilmot, Richard Dean, to Hughes Aircraft Company. Radar video processing apparatus. 3,878,530, Cl. 343-5.0DP.

Wilson, Charles T.; and Wilson, George P. Auxiliary automobile heater. 3,877,639, Cl. 237-12.30C.

Wilson, George P.: *See—*
Wilson, Charles T.; and Wilson, George P., 3,877,639.

Wilson Greatbatch, Ltd.: *See—*
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Wilson, Richard B. Medallion display. 3,877,162, Cl. 40-10.00D.

Wilson, Richard W., to Motorola, Inc. Method of fabricating thin quartz crystal oscillator blanks. 3,877,122, Cl. 29-25.350.

Winderman, Jay B.: *See—*
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Windings, Inc.: *See—*
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Winitz, Milton. Test for metabolic conditions in blood or serum. 3,877,873, Cl. 23-230.00B.

Winkin, Justin P., to Foster Wheeler Corporation. Curtain air system for vapor generators. 3,877,440, Cl. 122-235.00B.

Winter, Hans-Jurgen: *See—*
Joschko, Gunter; Schriefl, Karl-Ekkehard; and Winter, Hans-Jurgen, 3,877,705.

Wirtz Manufacturing Company, Inc.: *See—*
Rader, Robert R., 3,877,620.

Wirz, Arno. Sheet feeding apparatus having travelling feed grippers. 3,877,694, Cl. 271-14.000.

Wittle, J. Kenneth: *See—*
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Wochnowski, Waldemar; Leckband, Uwe; Barth, Hans-Heinrich; and Hohm, Reinhard, to Hauni-Werke Korber & Co. KG. Conditioning of tobacco. 3,877,469, Cl. 131-136.000.

Wojcikowski, Richard J., to Dana Corporation. Fluidic sensor. 3,877,485, Cl. 137-829.000.

Wojtowicz, Edward A., to Burroughs Corporation. Bidirectional spring clutch having means to inhibit automatic shifting. 3,877,554, Cl. 192-12.0BA.

Wonderland, Harry J.; and Guzick, Lawrence L., to Flexitallic Gasket Company, Inc. Method and apparatus for removing water vapor from high pressure steam lines. 3,877,895, Cl. 55-97.000.

Worthing, Robert W., to North American Development Company. Hydraulic ice breaker. 3,877,407, Cl. 114-40.000.

Woycheshin, Elias A.; Rigge, Ronald J.; and Sobolev, Igor, to Kaiser Aluminum & Chemical Corporation. Flame retardant polymeric compositions. 3,878,166, Cl. 260-45.90R.

Wright, Maynard L.; Lehmann, Matt; and Cumming, Raymond C., to Stanford Research Institute. Optically operated microwave phased-array antenna system. 3,878,520, Cl. 343-854.000.

Wright, Thomas B., to TRW Inc. Fastener. 3,877,672, Cl. 248-503.000.

Wroblewski, Theodore: *See—*
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Wustefeld, Bernd, to Metastein Forschungsgesellschaft mbH. Porous mouldings. 3,877,954, Cl. 106-75.000.

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Yabe Optical Inst. Mfg. Co., Ltd.: *See—*
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Yabe, Shinji; and Seiyama, Kaoru, to Yabe Optical Inst. Mfg. Co., Ltd. Rear converter lens. 3,877,796, Cl. 350-215.000.

Yamada, Tadashi: *See—*
Ono, Kaoru; Kamada, Masashi; Ohisuru, Hiroyuki; Wakabayashi, Yoshikazy; Nakamura, Shotaro; and Yamada, Tadashi, 3,877,881.

Yamadera, Shigenori: *See—*
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Yamagishi, Toru: *See—*
Kurihara, Takao; Tanaka, Nobuo; Yamagishi, Toru; Nakaoka, Kazuhide; Araki, Kenzi; Iwase, Kozi; and Kubotera, Haruo, 3,877,684.

Yamagoshi, Tanoshi: *See—*
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Yamaguchi, Susumu: *See—*
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Yamaguchi, Takanori: *See—*
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Yamaha Hatsudoki Kabushiki Kaisha: *See—*
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Yamashita, Nobuo, to Olympus Optical Company Limited. Small retrofocus type super wide-angle objective lens system. 3,877,795, Cl. 350-214.000.

Yamato Scale Company, Limited: *See—*
Higuchi, Hiroshi; Fujita, Hiroshi; and Masuda, Yasutoshi, 3,878,399.

Yamawaki, Takeshi: *See—*
Sakurai, Katsuo; and Yamawaki, Takeshi, 3,877,749.

Yamazaki, Shumpei; and Sugimura, Yuriko. Semiconductor memories. 3,878,549, Cl. 357-23.000.

Yanagi, Kimiyoshi: *See—*
Tanaka, Kazuaki; Ishida, Yasuto; Sato, Mamoru; Kishimoto, Hidetaka; and Yanagi, Kimiyoshi, 3,878,058.

Yanagida, Kiyomi; Hirokane, Tadashi; Tsukiyasu, Tadashi; and Sato, Tomoari, to Sumitomo Chemical Co., Ltd. Process for electrolytic coloring of the anodic oxide film on a aluminum or aluminum base alloys. 3,878,056, Cl. 204-35.00N.

Yanagishima, Takayuki: *See*—
Takeuchi, Yasuhisa; and Yanagishima, Takayuki, 3,877,541.

Yanai, Tokiyoshi: *See*—
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Yankee Artists, Incorporated: *See*—
Booras, Peter J.; Brenneman, Richard S.; and Lovering, David W., 3,877,786.

Yasakov, Evgeny Ivanovich: *See*—
Leonidov, Nikolai Konstaninovich; Levin, Lev Yakovlevich; Ipatov, Petr Platonovich; Krasavtsev, Nikolai Ivanovich; Shtepa, Evgeny Dmitrievich; Gerasimenko, Jury Markovich; Degtyarev, Valery Stepanovich; Rybtsov, Alexandr Fedorovich; Tankin, Anatoly Dmitrievich; Sukhorukov, Alexandr Efimovich; Kovylin, Mikhail Mikhailovich; Markovsky, Jury Lvovich; Ryazanov, Evgeny Makarovich; Altukhov, Vyacheslav Alexeevich; Kononov, Valentin Alexeevich; and Yasakov, Evgeny Ivanovich, 3,877,686.

Yatsenko, Sergei Vasilievich: *See*—
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Yeagle, Richard J., to Skuttle Manufacturing Company. Slip clutch assembly for torque limiting drive for humidifier rotors and the like. 3,877,253, Cl. 64-29.000.

Yee, Seening: *See*—
Broder, Alan; Shapiro, Paul; and Yee, Seening, 3,878,381.

Yehan Numata: *See*—
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Yeomans, John Stephen: *See*—
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Yew, Nelson C.; and Lane, Wyman C., to Etec Corporation. Specimen analysis with ion and electrom beams. 3,878,392, Cl. 250-306.000.

Yokoi, Junichi. Device for making lists by copying portions of documents in an integrated form. 3,877,164, Cl. 40-104.040.

Yonezawa, Teruhiko; and Watanabe, Masaru, to Fuji Photo Film Co., Ltd. Photosensitive printing composition. 3,877,948, Cl. 96-93.000.

York, Lawrence R.: *See*—
Epstein, Jacob J.; and York, Lawrence R., 3,877,362.

Yoshida, Kazutoshi, to Hitachi, Ltd. Sensing circuit for use in core memory. 3,878,543, Cl. 340-174.0AD.

Young, Alvin H.: *See*—
Vail, Sidney L.; Young, Alvin H.; and Verburg, Gerald B., 3,877,872.

Young, David W. Airport lighting and radar reflector combination. 3,878,506, Cl. 340-27.0NA.

Yuhas, Charles A.: *See*—
Hall, Walter O.; and Yuhas, Charles A., 3,877,388.

Yui, Hiroshi: *See*—
Koga, Michio; Fujii, Masaki; and Yui, Hiroshi, 3,878,183.

Zammit, John A., to General Motors Corporation. Apparatus and method for adhesively bonding a roof covering to an automotive vehicle roof. 3,878,010, Cl. 156-71.000.

Zankl, Frank: *See*—
Kirkham, Edward E.; Zankl, Frank; Stobbe, Richard E.; and Schachte, John J., 3,878,445.

Zauskey, Fredrick Thomas. Whip finishing implement. 3,877,736, Cl. 289-17.000.

Zavasnik, Frederick, to Phillips Petroleum Company. Forming parisons with nucleated inner layer. 3,878,033, Cl. 428-36.000.

Zebley, Donald Dane, deceased (by Zebley, Mildred S., executrix), to United Merchants and Manufacturers, Inc. Leverage weight control for torque generating mechanism. 3,877,657, Cl. 242-75.500.

Zebley, Mildred S., executrix: *See*—
Zebley, Donald Dane, deceased, 3,877,657.

Zelvinsky, Alexandr Lvovich: *See*—
Alexeev, Semen Mikhailovich; Arkhangelsky, Mark Nikolaevich; Baldin, Valentin Pavlovich; Braverman, Boris Solomonovich; Vasiliev, Jury Dmitrievich; Gorjushev, Vladimir Petrovich; Zelvinsky, Alexandr Lvovich; Rogachev, Jury Petrovich; Severin, Gai Ilich; Spassky, Jury Andreevich; Spolitak, Boris Vasilievich; Ushinin, Vladimir Vladimirovich; and Utyamushev, Rustam Ismailovich, 3,877,427.

Zengel, Hans; Frank, Dieter; and Bergfeld, Manfred, to Akzo N.V. Process for the production of terephthalic acid dichloride. 3,878,244, Cl. 260-544.00M.

Zenith Radio Corporation: *See*—
Henrickson, Melvin C., 3,878,466.

Zenk, George E.: *See*—
Willhite, Charles C.; and Zenk, George E., 3,878,403.

Ziegler, George William, Jr.; and Demler, Henry William, Jr., to AMP Incorporated. Aluminum electrical connection. 3,878,318, Cl. 174-94.00R.

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Zinnes, Harold: *See*—
Sircar, Jagadish C.; Zinnes, Harold; and Shavel, John, Jr., 3,878,198.

Zucchini, Guido. Condenser for streams of gas, in particular streams of gas exiting from the wash tank of plants for dry cleaning. 3,877,516, Cl. 165-111.000.

Zucker, Fredric E.: *See*—
Storace, Anthony; and Zucker, Fredric E., 3,877,531.

Zupancic, Boris, to LEK tovarna farmacevtskih in kemicnih izdelkov. Process for preparing perchloromethylmercaptane. 3,878,243, Cl. 260-543.00H.

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Air-Industrie: *See*—
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McMillen, Bobby E. Re. 28,395.

American Hospital Supply Corp.: *See*—
Staunt, Martin. Re. 28,390.

Dubuque Awning & Tent Co.: *See*—
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Frommelt, Cyril P., and S. J., to Dubuque Awning & Tent Co. Loading dock shelters. Re. 28,391, 4–15–75, Cl. 52—173.

Frommelt, Sylvan J.: *See*—
Frommelt, Cyril P., and S. J. Re. 28,391.

Hirata, Hiroshi, to Minolta Camera Kabushiki Kaisha. Device for checking driving battery voltage in a motion-picture camera with a wide range of frame speed. Re. 28,393, 4–15–75, Cl. 352—170.

McMillen, Bobby E., to Ambac Industries, Inc. Magneto ignition system for internal combustion engines and the like. Re. 28,392, 4–15–75, Cl. 123—149.

McMillen, Bobby E., to Ambac Industries, Inc. Magneto ignition system for internal combustion engines and the like. Re. 28,395, 4–15–75, Cl. 322—91.

Melinder, Arthur A., deceased, by Melinder, Betty G., executrix. Indexable bit cutting tool holder. Re. 28,389, 4–15–75, Cl. 29—96.

Melinder, Betty G.: *See*—
Melinder, Arthur A., and B. G. Re. 28,389.

Minolta Camera Kabushiki Kaisha: *See*—
Hirata, Hiroshi. Re. 28,393.

Point, Marcel, to Air-Industria. Apparatus for testing electrical contact between metallic objects. Re. 28,394, 4–15–75, Cl. 317—3.

Staunt, Martin, to American Hospital Supply Corp. Air driven dental handpieces. Re. 28,390, 4–15–75, Cl. 32—27.

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Nemcik, Stephen R., ½ interest to Frank Gilkerson. Avocado tree. 3,703, 4–15–75, Cl. 44.

Palacky, Edward H., to Hilltop Orchards & Nurseries, Inc. Pear tree. 3,705, 4–15–75, Cl. 36.

Yuge, Takeo, to Geo. J. Ball, Inc. Azelea plant. 3,704, 4–15–75. Cl. 56.

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Achenbach, Walter B., to Owens-Illinois, Inc. Decanter or similar article. 234,900, 4–15–75, Cl. D7—52.

Adams, Joseph E. Combination holster, handcuff and cartridge carrier. 234,840, 4–15–75, Cl. D22—13.

Aero Electronics Development Co., Inc.: *See*—
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Koster, Charles A., and Perry. 234,921.

Alexander, Jerry E., to First Step House Inc. Wall bracket for supporting kerosene lamps or the like. 234,909, 4–15–75, Cl. D8—247.

Allen, Charles V., G. R. Penn, and M. G. Richards, to General Motors Corp. Tire. 234,926, 4–15–75, Cl. D12—143.

Allen, Dorothy K. Medallion. 234,852, 4–15–75, Cl. D29—19.

Allen, Dorothy K. Medallion. 234,853, 4–15–75, Cl. D29—19.

Allen, Dorothy K. Medallion. 234,854, 4–15–75, Cl. D29—19.

Allen, Dorothy K. Medallion. 234,855, 4–15–75, Cl. D29—19.

Allen, Frank N. Heraldic plaque. 234,856, 4–15–75, Cl. D29—23.

Allgemine Elektricitats-Gesellschaft AEG Telefunken: *See*—
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Aoki, Katashi. Injection blow molding machine. 234,874, 4–15–75, Cl. D55—1.

Barlow, Gordon A., to Marvin Glass & Associates. Horseracing gameboard. 234,859, 4–15–75, Cl. D34—5.

Bee, James W.: *See*—
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Bee, James W. M.: *See*—
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Berg, Albert T., Jr., and H. Langile. Wire or rope tightener. 234,903, 4–15–75, Cl. D8—44.

Besenbruch-Hofmann, Inc.: *See*—
Slama, Charles. 234,919.

Beversdorf, Samuel T., to Robert W. Wachtel, d.b.a. Wachtel Music Products. Note for trombone. 234,875, 4–15–75, Cl. D56—1.

Bezborodko, Joseph. Frame. 234,895, 4–15–75, Cl. D6—242.

Bezborodko, Joseph. Mirrored molding. 234,896, 4–15–75, Cl. D6—246.

Birko Chemical Corp.: *See*—
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Bojanowski, Robert H. Combination fishing rod and line holder. 234,841, 4–15–75, Cl. D22—25.

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Breger, Carl-Arne, to Sandvik Aktiebolag. Hand saw. 234,906, 4–15–75, Cl. D8—95.

Burke, Jacob B., and Z. G. Rosen. Hand pointer for a game board or similar article. 234,862, 4–15–75, Cl. D34—5.

Bush, Joseph S. Set of chess pieces. 234,860, 4–15–75, Cl. D34—5.

Chase, Ascher, to General Foam Plastics Corp. Slide pool. 234,861, 4–15–75, Cl. D34—5.

Colan, John V., to Crownmark Corp. Display rack for luggage tags or the like. 234,893, 4–15–75, Cl. D6—151.

Cook, Raymon W. Golf putter head. 234,858, 4–15–75, Cl. D34—5.

Cox, William G., III. Steerable water ski sled. 234,866, 4–15–75, Cl. D34—41.

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Culling, John H., and E. S. St. Pellicer. Handle for fencing epee, sabre or foil. 234,838, 4–15–75, Cl. D22—1.

Culling, John H., and E. S. St. Pellicer. Handle for fencing epee or foil handle. 234,839, 4–15–75, Cl. D22—1.

Davis, J. C. Extension spray gun. 234,845, 4–15–75, Cl. D23—17.

Dawson, Thomas J., to Genie Toys, Inc. Toy stuffed dog. 234,857, 4–15–75, Cl. D34—2.

Dazey Products Co.: *See*—
McNair, Samuel L. 234,880.
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Eldon Industries, Inc.: *See*—
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Fong, Barrington. Ornamental vase holder. 234,892, 4–15–75, Cl. D6—114.

Foster, Harold S., C. J. Ortega, and A. R. Knowles, to Eldon Industries, Inc. Support stand for a battery operated tool. 234,905, 4–15–75, Cl. D8—71.

Freedman, Joseph J., and S. B. Grayson, to Lanvin-Charles of the Ritz, Inc. Container for cosmetics, or the like. 234,915, 4–15–75, Cl. D9—164.

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Gulack, Max A. Underwear, swimwear or like garment with fig leaf. 234,884, 4–15–75, Cl. D2—11.
Hayes, George J., and G. M. Stewart, to United States of America, Army. Protective helmet. 234,885, 4–15–75, Cl. D2—231.
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Hepp, Jerry P., and G. R. Thomas. Three-wheel vehicle. 234,923, 4–15–75, Cl. D12—107.
Hoeweler, Alan E., H. N. Bollinger, and T. L. Bernard, to General Mills Fun Group, Inc. Toy projector. 234,864, 4–15–75, Cl. D34—15.
Hoffman, John J. Pipe adapter. 234,847, 4–15–75, Cl. D23—45.
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Horst, John V., and M. Dunn, to Wilkerson Corp. Air treatment unit. 234,848, 4–15–75, Cl. D23—149.
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House, Lawrence, II., and T. Prisland, to Litton Medical Products, Inc. Dental chair. 234,889, 4–15–75, Cl. D6—22.
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Karelitz, Judith. Kaleidoscope. 234,863, 4–15–75, Cl. D34—15.
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152 3,877,165

CLASS 42

1S 3,877,166
75B 3,877,167

CLASS 43

42.31 3,877,168

CLASS 44

40 3,877,886
58 3,877,887
66 3,877,888
73 3,877,889
76 3,877,890

CLASS 46

1K 3,877,169
23 3,877,170
228 3,877,171

CLASS 47

1.2 3,877,172

CLASS 49

7 3,877,173
334 3,877,174

CLASS 51

9M 3,877,175
90 3,877,176
131 3,877,177
163 3,877,178
165R 3,877,179
165.9 3,877,180
217R 3,877,181
217T 3,877,182
283 3,877,183
284 3,877,184
293 3,877,891
358 3,877,185

CLASS 52

82 3,877,186
143 3,877,187
169 3,877,188
173 Re.28,391
475 3,877,189
484 3,877,190
632 3,877,191
638 3,877,192
665 3,877,193
730 3,877,194
741 3,877,195

CLASS 53

3 3,877,196
22B 3,877,197
48 3,877,198
59R 3,877,199
67 3,877,200
151 3,877,201
207 3,877,202
228 3,877,203
328 3,877,204
376 3,877,205

CLASS 55

17 3,877,892
48 3,877,893
67 3,877,894
97 3,877,895
105 3,877,896
111 3,877,897
122 3,877,898
272 3,877,899
304 3,877,901
337 3,877,902
366 3,877,900
381 3,877,903
392 3,877,904
404 3,877,905
3,877,906
413 3,877,907
419 3,877,908
487 3,877,909
502 3,877,910

CLASS 56

12.8 3,877,206
13.2 3,877,207
328R 3,877,208

CLASS 57

34R 3,877,209
3,877,210
58.89 3,877,211
100 3,877,212
140R 3,877,213
164 3,877,214

CLASS 58

28R 3,877,215
39.5 3,877,216
85.5 3,877,217

CLASS 60

39.05 3,877,218
39.38 3,877,219
39.63 3,877,220
39.65 3,877,221
274 3,877,222
307 3,877,223
389 3,877,224
403 3,877,225
545 3,877,226
548 3,877,227
585 3,877,228
597 3,877,229
606 3,877,230
654 3,877,231
657 3,877,232

CLASS 61

5 3,877,233
45B 3,877,235
45D 3,877,234
47 3,877,236
72.4 3,877,237
3,877,238

CLASS 62

6 3,877,239
50 3,877,240
137 3,877,241
138 3,877,242
180 3,877,243
314 3,877,244
317 3,877,245
402 3,877,246
428 3,877,247
511 3,877,248

CLASS 63

15 3,877,249
23 3,877,250

CLASS 64

21 3,877,251
25 3,877,252
29 3,877,253
3,877,259

CLASS 65

3 3,877,911
3,877,912
18 3,877,913
21 3,877,914
29 3,877,915
119 3,877,916
135 3,877,917
142 3,877,918
194 3,877,919

CLASS 66

9B 3,877,254
13 3,877,255
24 3,877,256
50R 3,877,257
93 3,877,258

CLASS 69

33 3,877,260

CLASS 70

90 3,877,261
92 3,877,262
149 3,877,263
237 3,877,264
252 3,877,265
280 3,877,266
358 3,877,267
364R 3,877,268
456R 3,877,269

CLASS 71

21 3,877,920
67 3,877,922
76 3,877,921
88 3,877,923
92 3,877,924
98 3,877,925
105 3,877,926
3,877,927
111 3,877,928

CLASS 72

8 3,877,270
23 3,877,271
60 3,877,272
108 3,877,273
177 3,877,275
238 3,877,276
259 3,877,277
270 3,877,278
319 3,877,279
325 3,877,280
364 3,877,281
393 3,877,282
398 3,877,283
402 3,877,284
429 3,877,285
450 3,877,286

CLASS 73

3 3,877,287
11 3,877,288
3,877,289
16 3,877,290
27R 3,877,291
37.5 3,877,292
49.1 3,877,293
67.2 3,877,294
3,877,295
71.1 3,877,296
81 3,877,297
3,877,298
132 3,877,299
136A 3,877,274
3,877,300
155 3,877,301
159 3,877,302
228 3,877,303
231M 3,877,304
254 3,877,305
358 3,877,306
362AR 3,877,307
362CP 3,877,308
425.4R 3,877,309
425.6 3,877,310
432PS 3,877,311
432SD 3,877,314
459 3,877,315
516R 3,877,313
517B 3,877,314

CLASS 74

5.5 3,877,316
5.6A 3,877,317
481 3,877,318
492 3,877,319
759 3,877,320
768 3,877,321
823 3,877,322
826 3,877,323

CLASS 75

.5AA 3,877,931
.5R 3,877,930
J 3,877,929
109 3,877,932
129 3,877,933

CLASS 76

25A 3,877,324

CLASS 81

3R 3,877,325
57.38 3,877,326
121R 3,877,327
185 3,877,328

CLASS 82

2R 3,877,329

CLASS 83

6 3,877,330
13 3,877,331
3,877,332
17 3,877,333
22 3,877,334
501 3,877,335
512 3,877,336

CLASS 84

1.01 3,877,337
453 3,877,338

CLASS 85

9R 3,877,339
28 3,877,340
32V 3,877,341
75 3,877,342

CLASS 89

1.5R 3,877,343

CLASS 91

406 3,877,344
411R 3,877,346
412 3,877,345
438 3,877,347

CLASS 92

13 3,877,348
53 3,877,349
187 3,877,350
220 3,877,351

CLASS 93

35H 3,877,352
36A 3,877,353
44.1R 3,877,354

CLASS 96

1LY 3,877,963
1.4 3,877,934
1.5 3,877,935
3,877,936
1.6 3,877,937
29L 3,877,938
36.3 3,877,939
48HD 3,877,940
48R 3,877,941
50R 3,877,942
67 3,877,943
3,877,944
84A 3,877,945
87R 3,877,946
3,877,947
93 3,877,948
99 3,877,949
115R 3,877,950

CLASS 98

2 3,877,355
40D 3,877,356
43 3,877,357

CLASS 99

275 3,877,358
331 3,877,359
358 3,877,360
478 3,877,361
570 3,877,362

CLASS 100

37 3,877,364
117 3,877,365
121 3,877,366

CLASS 101

44 3,877,367
148 3,877,368
157 3,877,369
216 3,877,370
425 3,877,371
465 3,877,372

CLASS 102

23 3,877,373
38 3,877,374
45 3,877,375
67 3,877,376
70.2P 3,877,377
3,877,382
71 3,877,378
74 3,877,379
92.4 3,877,380
3,877,381
93 3,877,383

CLASS 104

6 3,877,384
167 3,877,385
172R 3,877,386

CLASS 105

49 3,877,387
139 3,877,388
158R 3,877,389
159 3,877,390
163R 3,877,391
282P 3,877,392
395 3,877,394
492 3,877,393

CLASS 106

15AF 3,877,951
15FP 3,877,952
54 3,877,953
75 3,877,954
266 3,877,955
287SB 3,877,956
288Q 3,877,957

CLASS 108

111 3,877,395
3,877,396

CLASS 110

8C 3,877,400
8E 3,877,399
8R 3,877,397
3,877,398
99R 3,877,402

CLASS 111

7 3,877,401

CLASS 112

77 3,877,403
240 3,877,404
255 3,877,405

CLASS 114

39 3,877,406
40 3,877,407
67A 3,877,408

CLASS 115

25 3,877,409

CLASS 116

31 3,877,410
114.5 3,877,411
137R 3,877,412

CLASS 118

7 3,877,413
234 3,877,414
303 3,877,415
637 3,877,416
3,877,417
642 3,877,418

CLASS 119

14.03 3,877,419
15 3,877,420

CLASS 122

235B 3,877,440
250R 3,877,441

CLASS 123

8.45 3,877,442
41.08 3,877,443
75B 3,877,444
90.35 3,877,445
90.55 3,877,446
119A 3,877,447
3,877,452
119B 3,877,451
119E 3,877,450
119F 3,877,448
119R 3,877,449
148E 3,877,453
149A Re.28,392
198D 3,877,455
198E 3,877,454

CLASS 125

11A 3,877,456

CLASS 126

39R 3,877,457
44 3,877,458
113 3,877,459
200 3,877,460

CLASS 128

1R 3,877,461
3,877,462
2B 3,877,464
2F 3,877,465
2H 3,877,463
2.08 3,877,467
2.1B 3,877,466
25R 3,877,421
57 3,877,422
83.5 3,877,423
92A 3,877,424
142 3,877,425
165 3,877,426
204 3,877,427
214R 3,877,428
214.4 3,877,429
235 3,877,430
283 3,877,431
287 3,877,432
303R 3,877,433
327 3,877,434
334C 3,877,435
348 3,877,436
373 3,877,437
419PG 3,877,438
547 3,877,439

CLASS 131

2 3,877,468
136 3,877,469
261B 3,877,470

CLASS 132

9 3,877,471
143 3,877,472

CLASS 133

5A 3,877,473

CLASS 134

6 3,877,474

CLASS 136

6LN 3,877,983
6F 3,877,984
24 3,877,985
3,877,986
29 3,877,987
83R 3,877,988
86A 3,877,990
86B 3,877,989
107 3,877,992
3,877,993
121 3,877,994
146 3,877,995
160 3,877,996
177 3,877,991

CLASS 137

66 3,877,475
75 3,877,476
82 3,877,477
94 3,877,478
185 3,877,479
329.06 3,877,480
340 3,877,481
446 3,877,482
625.64 3,877,483
625.66 3,877,484
829 3,877,485
831 3,877,486

CLASS 138

42 3,877,487
44 3,877,488
46 3,877,489
141 3,877,490
149 3,877,491

CLASS 139

26 3,877,492
374 3,877,493

CLASS 140

71R 3,877,494
71.5 3,877,495

CLASS 141

4 3,877,496
138 3,877,497
198 3,877,498
310 3,877,499

CLASS 144

251A 3,877,500

CLASS 148

1.5 3,877,997
6.15 3,877,998
105 3,877,999
108 3,878,000
186 3,878,001

CLASS 149

19.3 3,878,002
19.8 3,878,003
88 3,878,004

CLASS 150

52R 3,877,501

CLASS 151

20 3,877,502

CLASS 152

379 3,877,503
405 3,877,504

CLASS 156

2 3,878,005
3 3,878,006
11 3,878,007
3,878,008
41 3,878,009
71 3,878,010
72 3,878,011
94 3,878,012
132 3,878,013
167 3,878,014
222 3,878,015
265 3,878,016
266 3,878,017
267 3,878,018
272 3,878,019
291 3,878,020
331 3,878,021
363 3,878,022
394 3,878,023
428 3,878,024
441.5 3,878,025
552 3,878,026
580 3,878,027

CLASS 157

1.28 3,877,505
13 3,877,506

CLASS 159

4SR 3,878,028
6WH 3,878,029

CLASS 162

73 3,878,037
167 3,878,038
176 3,877,968
336 3,878,039

CLASS 164

155 3,877,507
274 3,877,508
278 3,877,509
283S 3,877,510

CLASS 165

1 3,877,511
3 3,877,512
26 3,877,513
38 3,877,514
86 3,877,515
111 3,877,516
146 3,877,517
150 3,877,518
166 3,877,519

CLASS 166

.6 3,877,520
245 3,877,521
295 3,877,522

CLASS 169

17 3,877,524
48 3,877,525
3,877,526
90 3,877,527

CLASS 173

23 3,877,528

CLASS 174

9F 3,878,312
19 3,878,313
37 3,878,314
57 3,878,315
68.5 3,878,316
92 3,878,317
94R 3,878,318
106SC 3,878,319
135 3,878,320
144 3,878,321

CLASS 175

65 3,877,529
297 3,877,530

CLASS 176

19LD 3,878,040
67 3,878,041
78 3,878,042

CLASS 177

1 3,877,531
229 3,877,532

CLASS 178

5.1 3,878,322
6.8 3,878,323
7.2 3,878,324
7.3DC 3,878,325
7.3R 3,878,326
7.5D 3,878,328
7.5R 3,878,327
7.85 3,878,329
7.92 3,878,330
22 3,878,331
3,878,332
23A 3,878,333
69.5TV 3,878,335
3,878,336
69.5R 3,878,334

CLASS 179

1VC 3,878,337
15AT 3,878,338
15BS 3,878,339
18HB 3,878,340
98 3,878,341
100R 3,878,343
100.1VC 3,877,363
100.41D 3,878,342

CLASS 180

5R 3,877,533
3,877,534
3,877,535
3,877,536
6.3 3,877,537
6.48 3,877,538
32 3,877,539
79.2R 3,877,540
99 3,877,541
120 3,877,542

CLASS 182

133 3,877,543
141 3,877,544

CLASS 184

6.18 3,877,546
6.26 3,877,547
6.3 3,877,545

CLASS 187

8.43 3,877,548

CLASS 188

38 3,877,549
106P 3,877,550
218XL 3,877,551
268 3,877,552

CLASS 191

49 3,877,553

CLASS 192

12BA 3,877,554
45 3,877,555
45.1 3,877,556
98 3,877,557
3,877,558

CLASS 194

4G 3,877,559

CLASS 195

29 3,878,043
3,878,044
49 3,878,045
51R 3,878,046
80R 3,878,047
99 3,878,048
100 3,878,050
103.5R 3,878,049

CLASS 197

133R 3,877,560
151 3,877,561

CLASS 198

24 3,877,562
31AB 3,877,563
103 3,877,564
127R 3,877,565
160 3,877,566
189 3,877,567
204 3,877,568
243 3,877,569

CLASS 200

6B 3,878,344
38R 3,878,345
43 3,878,346
67D 3,878,347
157 3,878,348
209 3,878,349

CLASS 201

17 3,878,051
20 3,878,052

CLASS 202

223 3,878,053

CLASS 203

11 3,878,054
35 3,878,057
37 3,878,055
63 3,878,058

CLASS 204

1T 3,878,059
3,878,064
1.5 3,878,060
11 3,878,061
15 3,878,062
3,878,063
35N 3,878,056
40 3,878,065
43G 3,878,066
43T 3,878,067
46G 3,878,068
55R 3,878,069
64R 3,878,070
92 3,878,071
95 3,878,072
140 3,878,073
158R 3,878,074
159.15 3,878,076
159.16 3,878,077
159.23 3,878,075
181 3,878,078
192 3,878,079
195P 3,878,080
197 3,878,081
266 3,878,082
290F 3,878,083
3,878,084
298 3,878,085
301 3,878,086

CLASS 206

.83 3,877,571
63.3 3,877,570
223 3,877,572
236 3,877,573
368 3,877,574
391 3,877,575
412 3,877,576

CLASS 208

40 3,878,087
50 3,878,088
139 3,878,089
188 3,878,090

CLASS 209

12 3,878,091
73 3,877,577
215 3,877,578

CLASS 210

23 3,877,978
31C 3,878,092
51 3,878,093
87 3,878,095
96 3,878,094
110 3,878,096
151 3,878,097
198C 3,878,099
3,878,100
202 3,878,101
230 3,878,102
243 3,878,103
323 3,878,104
351 3,878,106
500M 3,878,109

CLASS 211

176 3,877,579
184 3,877,580

CLASS 212

65 3,877,581

CLASS 214

1SW 3,877,582
2.5 3,877,583
6B 3,877,584
17CA 3,877,585
3,877,586
17D 3,877,587
21 3,877,588
23 3,877,589
75T 3,877,590
86A 3,877,591
309 3,877,592
315 3,877,593
450 3,877,594
506 3,877,595
518 3,877,596

CLASS 215

221 3,877,597
224 3,877,598

CLASS 217

26.5 3,877,599

CLASS 219

10.55E 3,878,350
69D 3,878,352
69G 3,878,351
69M 3,878,353
74 3,878,354
79 3,878,355
150V 3,878,356
209 3,878,357
216 3,878,358
261 3,878,359
312 3,878,360
522 3,878,361
528 3,878,362

CLASS 220

3.3 3,877,601
4R 3,877,602
23.83 3,877,603
267 3,877,604
269 3,877,606
271 3,877,605
334 3,877,600

CLASS 221

12 3,877,607
236 3,877,608

CLASS 222

1 3,877,609
78 3,877,611
129 3,877,612
146HE 3,877,610
180 3,877,613
209 3,877,614
263 3,877,615
321 3,877,616
3,877,617
402.2 3,877,618
494 3,877,619
537 3,877,620
559 3,877,621

CLASS 224

42.03B 3,877,622
42.1F 3,877,624
45S 3,877,623

CLASS 225

2 3,877,625
96.5 3,877,626

CLASS 226

33 3,877,627
113 3,877,628

CLASS 228

2 3,877,629

CLASS 229

14BL 3,877,630
41B 3,877,632
41C 3,877,631
51AS 3,877,633

CLASS 233

14R 3,877,634
30 3,877,635

CLASS 235

61V 3,878,363
61.11E 3,878,366
61.12M 3,878,367
61.7B 3,878,364
61.7R 3,878,365
83 3,878,368
92PC 3,878,369
92PD 3,878,371
92T 3,878,370
151.11 3,878,372
151.12 3,878,379
151.3 3,878,373
3,878,374
3,878,384
151.32 3,878,375
151.34 3,878,376
3,878,377
151.35 3,878,378
152 3,878,380
181 3,878,381
183 3,878,382
3,878,383

CLASS 236

14 3,877,636
44C 3,877,637

CLASS 237

2A 3,877,638
12.3C 3,877,639

CLASS 238

2 3,877,640
234 3,877,641

CLASS 239

2R 3,877,642
102 3,877,643
118 3,877,644
155 3,877,645
265.19 3,877,646

CLASS 240

1.3 3,878,385
6.4G 3,878,386
7.55 3,878,387
10L 3,878,503
25 3,878,505
41.35A 3,878,389
41.5 3,878,388
153 3,878,390

CLASS 241

39 3,877,647
45 3,877,648
57 3,877,649
71 3,877,650
85 3,877,651

CLASS 242

4C 3,877,652
25A 3,877,653
65 3,877,654
67.1R 3,877,655
68.3 3,877,656
75.5 3,877,657
84.2A 3,877,658
130.2 3,877,659
156 3,877,660
163 3,877,661

CLASS 244

1SA 3,877,662
110B 3,877,663
115 3,877,664
130 3,877,665

CLASS 246

122R 3,877,666

CLASS 248

4 3,877,667
154 3,877,668
188.7 3,877,669
298 3,877,670
346 3,877,671
503 3,877,672

CLASS 249

83 3,877,673
196 3,877,674

CLASS 250

211R 3,878,105
233 3,878,391
306 3,878,392
336 3,878,496
343 3,878,107
349 3,878,393
402 3,878,394
3,878,395
472 3,878,108
493 3,878,396
551 3,878,397
561 3,878,398
570 3,878,399

CLASS 251

144 3,877,675
145 3,877,676
228 3,877,677
305 3,877,678

CLASS 252

8.5B 3,878,110
8.5M 3,878,111
10 3,878,112
12 3,878,113
33.4 3,878,115
3,878,116
47 3,878,117
62.1L 3,878,120
90 3,878,118
186 3,878,098
301.4S 3,878,119
316 3,878,121
411R 3,878,122
426 3,878,123
429B 3,878,124
441 3,878,125
447 3,878,126
455Z 3,878,127
3,878,128
3,878,129
458 3,878,130
466PT 3,878,131

CLASS 254

135 3,877,679
189 3,877,680

CLASS 256

64 3,877,681

CLASS 259

7 3,877,682
106 3,877,683

CLASS 260

2EP 3,878,132
2.5BE 3,878,133
4R 3,878,134
8 3,878,135
14 3,878,136
16 3,878,137
17A 3,878,139

17R 3,878,138
3,878,140
3,878,141
17.2 3,878,142
17.4GC 3,878,144
17.4R 3,878,143
18EP 3,878,145
18PN 3,878,146
18R 3,878,147
22EP 3,878,148
23H 3,878,149
23.7R 3,878,150
29.6XA 3,878,152
29.6T 3,878,151
29.7D 3,878,153
29.7N 3,878,154
30.4N 3,878,156
30.4R 3,878,155
33.8UB 3,878,157
37N 3,878,158
38 3,878,159
3,878,160
42.27 3,878,164
42.42 3,878,161
45.7P 3,878,162
45.8NT 3,878,163
45.9R 3,878,165
3,878,166
3,878,167
46.5E 3,878,168
63R 3,878,169
64 3,878,170
73R 3,878,171
78UA 3,878,172
78L 3,878,173
78S 3,878,174
78.5BB 3,878,175
79.1 3,878,176
79.3MU 3,878,177
3,878,178
88.2R 3,878,179
89.5A 3,878,180
92.3 3,878,181
93.1 3,878,182
94.9R 3,878,183
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D2—	11	234,884		52	234,900	192	234,916		234,838		42	234,871		41	234,866
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Design Patents

4 :	234,920	9 :	234,844		234,917		234,912		234,892		234,923
	234,921		234,867	18 :	234,847		234,926		234,895	42 :	234,876
6 :	234,840		234,868		234,873		234,927		234,896		234,908
	234,865		234,869		234,875	27 :	234,903		234,915	44 :	234,893
	234,882	13 :	234,866		234,898	29 :	234,837		234,919	48 :	234,845
	234,887	17 :	234,852	19 :	234,925		234,838	37 :	234,842		234,858
	234,905		234,853	20 :	234,879		234,839		234,846		234,885
	234,910		234,854	21 :	234,860		234,857	39 :	234,864		234,886
	234,911		234,855	24 :	234,889	33 :	234,890		234,900		234,897
8 :	234,843		234,856	25 :	234,836	36 :	234,862		234,907	51 :	234,861
	234,848		234,859	26 :	234,841		234,863		234,922	55 :	234,918
	234,877		234,883		234,880		234,870	40 :	234,909	56 :	234,878
	234,924		234,916		234,902		234,884				

Plant Patents

6 :	3,703		3,704	26 :	3,705						

U. S. GOVERNMENT PRINTING OFFICE : O - 1975

U.S. DEPARTMENT OF COMMERCE
Frederick B. Dent, *Secretary*

PATENT AND TRADEMARK OFFICE
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